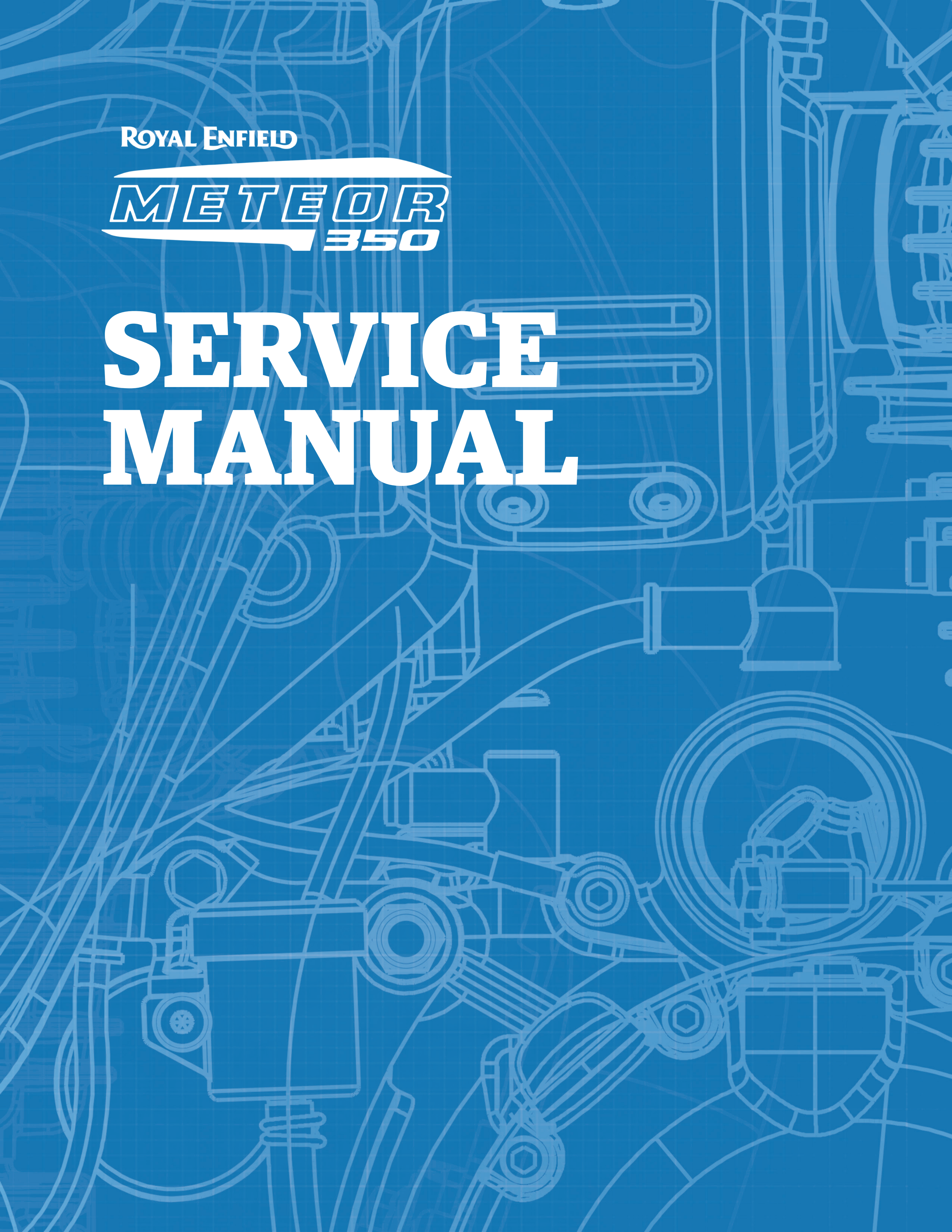
ROYAL ENFIELD

METEOR 350

SERVICE MANUAL



Foreword

The Meteor 350 is our new cruiser, easy on those long open highways, as it is in tight traffic situations.Fitted with our new 349 cc Air and Oil Cooled engine completely on a new frame, the motorcycle is designed for a more refined performance, confident handling and a comfortable ride, be it on long adventures or quick urban jaunts. A quintessential Royal Enfield,the Meteor 350, redolent with classic design cues, retains the signature exhaust note and gloriously blends timelessaesthetics with contemporary motorcycling needs.

This manual is to help you operate your motorcycle and guide it to maintain it the right way.

This manual is your friend, philosopher and guide when it comes to taking care of your motorcycle.

To know more about Royal Enfield, our products and other news, visit www.royalenfield.com

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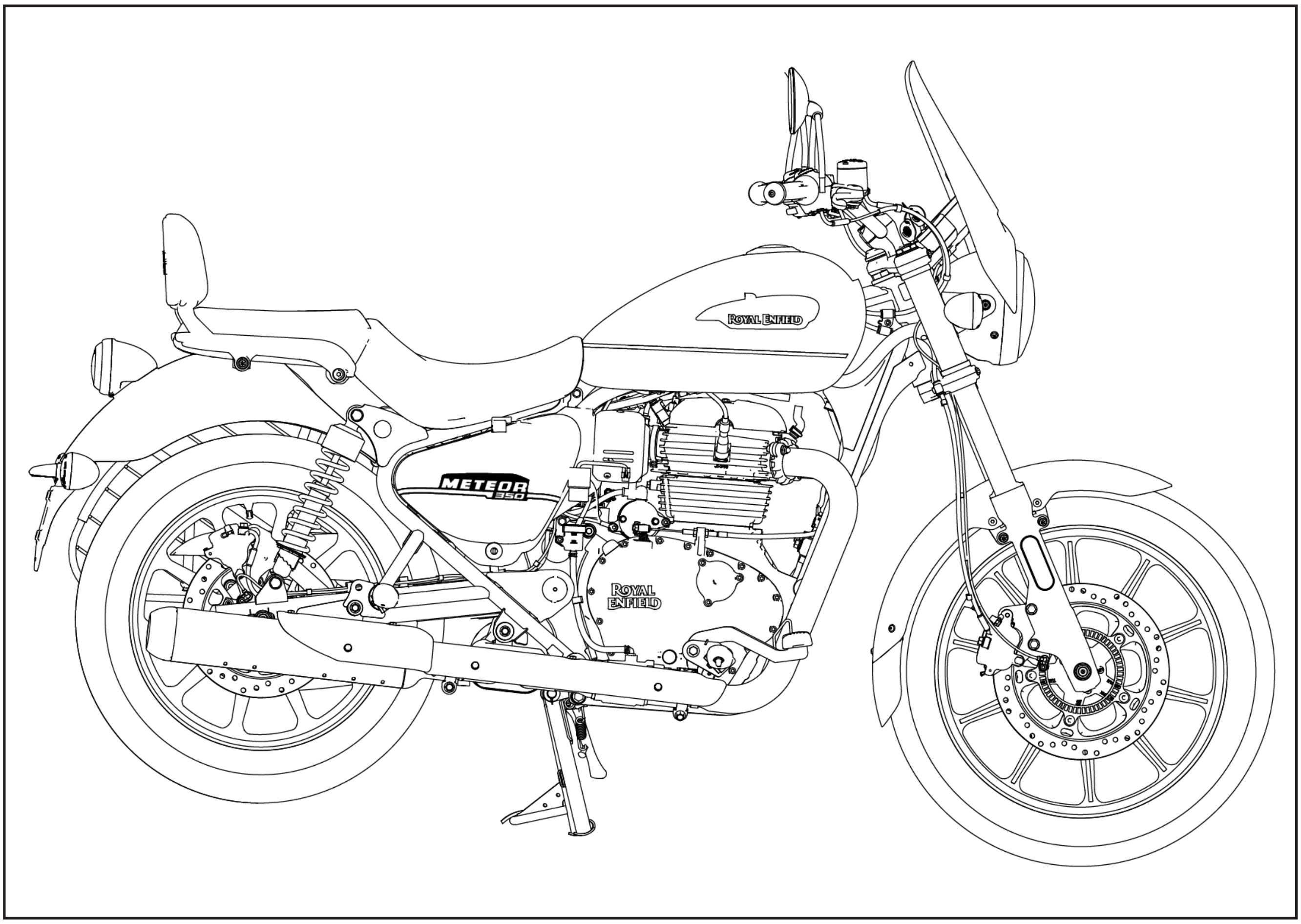
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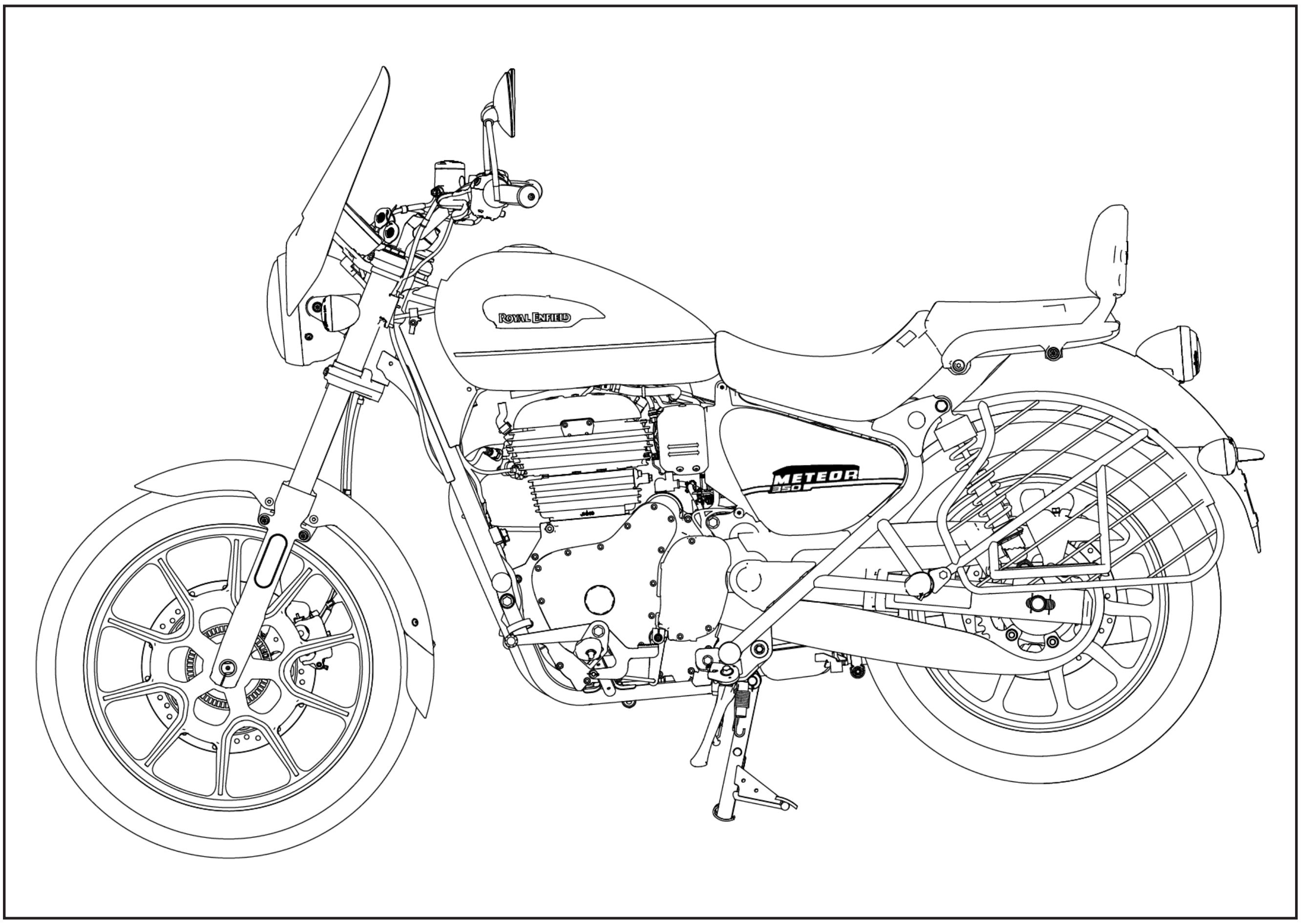
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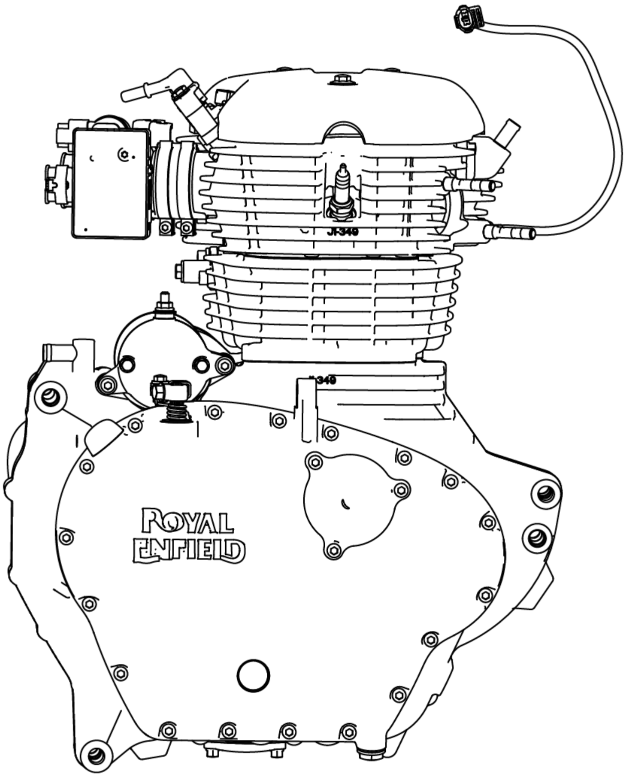
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GENERAL INFORMATION

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1. General Information

1.1 About this Manual

This service manual has been created primarily for use by a technically competent and trained service personnel to

- Get familiarized and understand the construction of various aggregates of motorcycles.
- Assist in carrying out the correct and factory-approved service and overhauling procedures of the motorcycles.

While it is not possible to comprehensively capture all the service practices in this manual, it is expected that the technically competent person would have a basic knowledge and understanding of carrying out systematic service and overhauling procedures.

We strongly recommend that personnel without basic understanding of repair techniques and procedures DO NOT attempt to service or overhaul any part of the motorcycle using this manual, as it might result in wrong diagnosis and repair and ultimately render the motorcycle unsafe for use and result in expensive repair costs for the customer.

We also STRONGLY recommend that any technician who wishes to service Royal Enfield motorcycles, undergo systematic technical trainings at our Royal Enfield training academies, where the correct servicing and overhauling procedures are imparted by experienced and competent trainers, providing hands on practical sessions.

Lastly, we would recommend and insist that the periodic maintenance and overhauling of the Royal Enfield motorcycles be carried out ONLY through authorized Royal Enfield service stations where factory trained and experienced service technicians are always available.

1.2 How to Use this Manual

This service manual is divided into several chapters as detailed below. This will help the technical personnel to easily refer to the particular section of interest, for carrying out the correct maintenance and repair procedure as recommended by Royal Enfield. **Click and explore on the blue icons to refer individual chapters.**

Chapter No.	Chapters
1	**General Information**
2	**Technical Specifications**
3	**Periodic Maintenance Schedule**
4	**General Tools and Special Tools**
5	**Engine**
6	**Chassis**
7	**Fuel System**
8	**EVAP (Evaporative Emission Control System)**
9	**Brakes and ABS (Anti-Lock Braking System)**
10	**EMS (Engine Management System)**
11	**Electrical System**
12	**Index and Glossary**

There are elaborate details of CAUTIONS, WARNINGS provided in this service manual in each of the individual chapters to highlight details of information and/or precautions that need to be taken while servicing the motorcycle aggregates.

1.3 Important Information

To enhance customer satisfaction and to improve the performance of the motorcycle, Royal Enfield will carrying out modifications and changes in the motorcycles in the years to come. Such changes will be intimated periodically and continuously through service bulletins and notifications to the authorized Royal Enfield dealers and service stations and will also be included in the future editions of this service manual.

1.4 General Precautions

Important information and points that need special focus and attention while servicing the motorcycles are highlighted in this service manual as follows:

NOTE	*Indicates points of particular interest for more efficient and convenient operation.*
WARNING	**Indicates points of particular interest for more efficient and convenient operation.**
CAUTION	**Alerts the technician about potential personal injury hazards.**

⚠ WARNING

Stop the engine when servicing the fuel system. Do not smoke or allow any open flame or sparks near gasoline. Gasoline is extremely flammable and highly explosive, which could result in serious injury or fatal accidents.

Do not use after-market parts which can adversely affect the performance. Removing or altering factory-installed parts can adversely affect performance and could result in serious injury or fatal accidents.

⚠ CAUTION

Any of the part not to be tamper or modified unless or otherwise advised by Royal Enfield dealear or Service personnel

1.5 Prior to Service

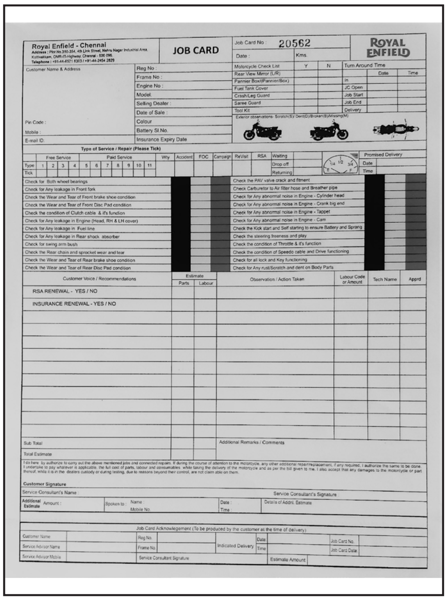
Proper preparation is very important before commencing any maintenance or repair on a motorcycle. This will not only result in an efficient and accurate repair job but will also save time and result in “FIRST TIME RIGHT” and help the customer gain confidence in the technician’s capability.

The following points are essential for carrying out maintenance or repairs on a motorcycle correctly:

1. **Understand and record customer concerns accurately.**
2. **Test-ride the motorcycle wherever required to understand the customer concerns accurately.**
3. **Refer to the past history of maintenance and repairs carried out on the motorcycle.**
4. **Water-wash and clean the motorcycle.**
5. **Maintain the work area – cleanliness, lighting, ventilation, etc.**
6. **Store appropriate general purpose and special tools for carrying out the maintenance.**
7. **Perform systematic dismantling and reassembly of the aggregates in the motorcycle.**
8. **Store required spares and consumables for the maintenance.**
9. **Perform correct inspection and diagnosis of the motorcycle.**
10. **Test-ride after repairs to ensure that motorcycle is performing correctly.**
11. **Explain the repairs and maintenance carried out to the customer.**
12. **Encourage customer to take a test-ride so as to gain confidence that the repairs have been carried out correctly and to his satisfaction.**

1.5.1. Customer Complaints

Discuss with customer to clearly understand their concerns and issues on the motorcycle. Create a job card detailing all the complaints mentioned.



Royal Enfield - Chennai
Address : Plot No.350-354, 4th Link Street, Nehru Nagar Industrial Area, Kottivakkam, OMR-IT-Highway, Chennai - 600 096.
Telephone : +91-44-6571 8303 / +91-44-2454 2829

JOB CARD

Job Card No : 20562
Date :
Kms.

ROYAL ENFIELD

Customer Name & Address
Pin Code :
Mobile :
E-mail ID:

Reg No :
Frame No :
Engine No :
Model:
Selling Dealer :
Date of Sale :
Colour
Battery Sl.No.
Insurance Expiry Date

Motorcycle Check List	Y	N
Rear View Mirror (L/R)		
Pannier Box/(Pannier/Box)		
Fuel Tank Cover		
Crash/Leg Guard		
Saree Guard		
Tool Kit		

Turn Around Time	Date	Time
In		
JC Open		
Job Start		
Job End		
Delivery		

Exterior observations- Scratch(S)/ Dent(D)/Broken(B)/Missing(M)

Type of Service / Repair (Please Tick)

	Free Service				Paid Service							Wty	Accident	FOC	Campaign	ReVisit	RSA
Type	1	2	3	4	5	6	7	8	9	10	11						
Tick																	

Waiting
Drop off
Returning

Promised Delivery
Date
Time

Check for Both wheel bearings				Check the PAV valve crack and fitment		
Check for Any leakage in Front fork				Check Carburetor to Air filter hose and Breather pipe		
Check the Wear and Tear of Front brake shoe condition				Check for Any abnormal noise in Engine - Cylinder head		
Check the Wear and Tear of Front Disc Pad condition				Check for Any abnormal noise in Engine - Crank big end		
Check the condition of Clutch cable & it's function				Check for Any abnormal noise in Engine - Tappet		
Check for Any leakage in Engine (Head, RH & LH cover)				Check for Any abnormal noise in Engine - Cam		
Check for Any leakage in Fuel line				Check the Kick start and Self starting to ensure Battery and Sprang		
Check for Any leakage in Rear shock absorber				Check the steering freeness and play		
Check for swing arm bush				Check the condition of Throttle & it's function		
Check the Rear chain and sprocket wear and tear				Check the condition of Speedo cable and Drive functioning		
Check the Wear and Tear of Rear brake shoe condition				Check for all lock and Key functioning		
Check the Wear and Tear of Rear Disc Pad condition				Check for Any rust/Scratch and dent on Body Parts		

Customer Voice / Recommendations	Estimate		Observation / Action Taken	Labour Code or Amount	Tech Name	Apprd
	Parts	Labour				
RSA RENEWAL - YES / NO						
INSURANCE RENEWAL - YES / NO						
Sub Total			Additional Remarks / Comments			
Total Estimate						

I do here by authorize to carry out the above mentioned jobs and connected repairs. If during the course of attention to the motorcycle, any other additional repair/replacement, if any required, I authorize the same to be done. I undertake to pay whatever is applicable, the full cost of parts, labour and consumables while taking the delivery of the motorcycle and as per the bill given to me. I also accept that any damages to the motorcycle or part thereof, while it is in the dealers custody or during testing, due to reasons beyond their control, are not claim able on them.

Customer Signature

Service Consultant's Name :
Service Consultant's Signature :

Additional Estimate Amount :
Spoken to : Name :
Mobile No.
Date :
Time :
Details of Addnl. Estimate

Job Card Acknowlegement (To be produced by the customer at the time of delivery)

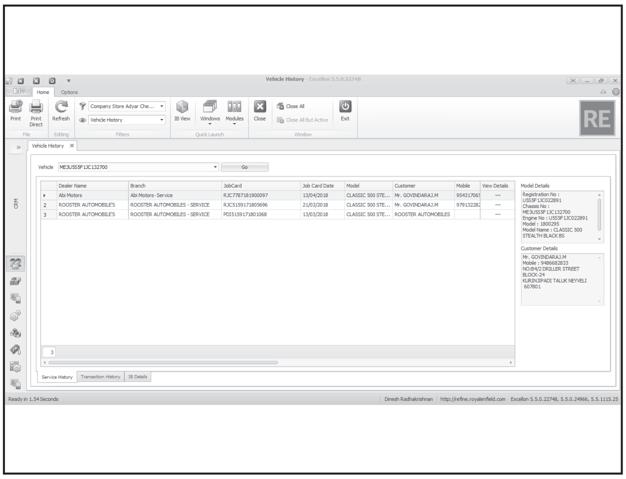
Customer Name
Service Advisor Name
Service Advisor Mobile
Reg.No.
Frame No.
Service Consultant Signature
Indicated Delivery Date
Time
Estimate Amount
Job Card No.
Job Card Date:

1.5.2. Test-Ride

Do a test ride wherever required to reconfirm issues mentioned by customer. This will also help to identify other issues if any.

1.5.3. Service Records

Check the service records.



Vehicle ME3U5S5F1JC132700

	Dealer Name	Branch	JobCard	Job Card Date	Model	Customer	Mobile	View Details
▸	Abi Motors	Abi Motors- Service	RJC7787181900097	13/04/2018	CLASSIC 500 STE...	Mr. GOVINDARAJ.M	954317065	...
2	ROOSTER AUTOMOBILE'S	ROOSTER AUTOMOBILES - SERVICE	RJC5159171805696	21/03/2018	CLASSIC 500 STE...	Mr. GOVINDARAJ.M	979132282	...
3	ROOSTER AUTOMOBILE'S	ROOSTER AUTOMOBILES - SERVICE	PDI5159171801068	13/03/2018	CLASSIC 500 STE...	ROOSTER AUTOMOBILES		...

3

Model Details
Registration No :
U5S5F1JC022891
Chassis No :
ME3U5S5F1JC132700
Engine No : U5S5F1JC022891
Model : 1800295
Model Name : CLASSIC 500
STEALTH BLACK BS

Customer Details
Mr. GOVINDARAJ.M
Mobile : 9486682833
NO:B4/2 DRILLER STREET
BLOCK-24
KURINJIPADI TALUK NEYVELI
607801

Ready in 1.54 Seconds | Dinesh Radhakrishnan | http://refine.royalenfield.com | Excellon 5.5.0.22748, 5.5.0.24966, 5.5.1115.25

1.5.4. Clean Work Area

Ensure the work space is clean and adequately ventilated fresh air.

1.5.5. Cleaning

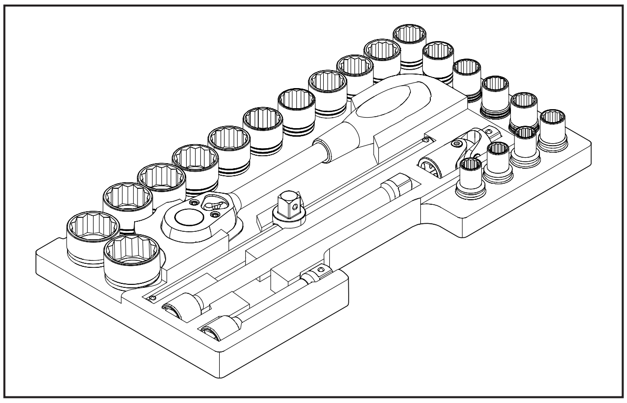
Cleaning before Dismantling and Inspection

Water-wash and clean the motorcycle for a thorough inspection to uncover any visual damages such as breakages, leaks, misalignments, etc., and to clearly understand the issues raised by the customer.

Clean the motorcycle thoroughly before disassembly to avoid dirt or other foreign materials entering into sealed areas as it can cause excessive wear and damage to the parts.

1.5.6. General and Special Tools

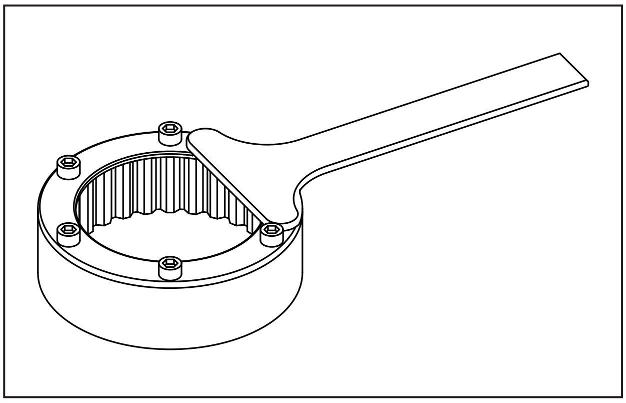
All general and special tools required for servicing are listed in the respective section of this service manual. Ensure that you have all the required tools for servicing. Place tools handy before beginning the service or maintenance.

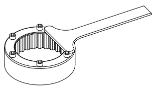


Special Tools

A list of special tools required for the dismantling and assembling of parts has been provided in each section.

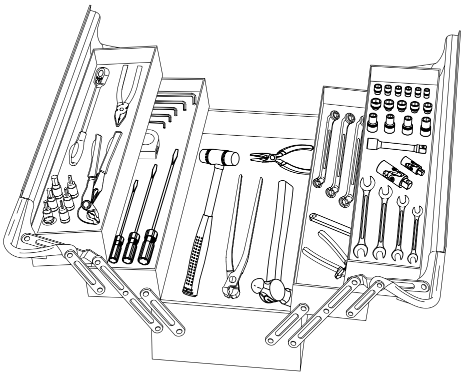
Ensure that only Royal Enfield recommended special tools are used wherever mentioned. Dismantling or assembling without the use of special tools may cause severe, irreparable damage to parts.



SPL	
	Part No: ST30921/A
	Part Name: Clutch holder

Storing Tools

After completing the job, ensure that all tools are cleaned and kept back in their designated place, so that they do not rust and can be easily found the next time.



Tool Usage and Safety

Use eye protection equipment when performing any task using air-operated tools.

Pneumatic tools should be used only for removal, and not for tightening.

Ratchets and Extension

Use an extension on a ratchet's handle or power handle at suitable places.

Torque wrenches should always be used only for tightening fasteners to their recommended torque.

Once you hear the click sound, stop tightening and remove the torque wrench from the fastener. Do not tighten further as it will cause damage to torque wrench and fastener.

Hammers and Mallets

Use eye protection equipment and gloves while using a hammer.

Use a hammer or mallet that is suitable for the job.

Use only a plastic mallet to remove or assemble delicate parts like Oil seals/dowels/bushes, especially in the engine. DO NOT use a metal hammer as it will cause damage to the parts.

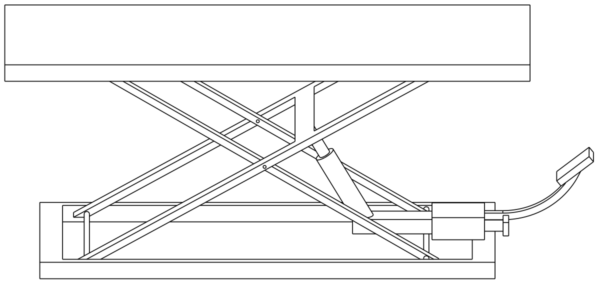
Screwdrivers

Use the right type and size of screwdriver at the right places.

Do not use a screwdriver for punching, chiseling or scraping, or as a lever to lift another object.

Use Ramp

Royal Enfield recommends the use of a suitable ramp to hold the motorcycle vertically in a convenient position for easy repairs.



1.5.7. Prior to Disassembly

Always ensure ignition switch and stop switch are in OFF position before dismantling any aggregate on the motorcycle.

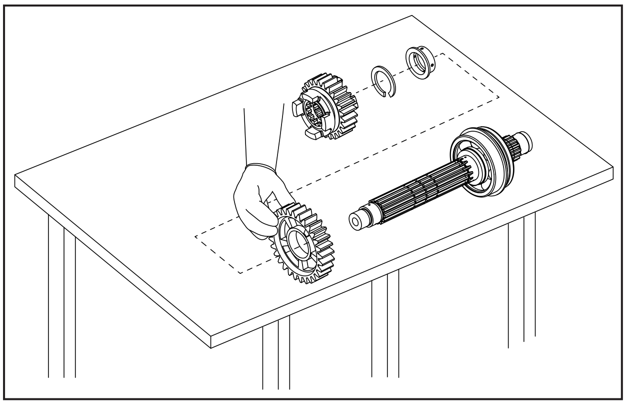
Always drain engine oil (in warm condition) whenever servicing any part of the engine/oil cooler.

Always drain fuel from the fuel tank whenever it is removed from the frame.

Always disconnect battery terminals whenever servicing the engine management system, ABS and/or any electrical wiring.

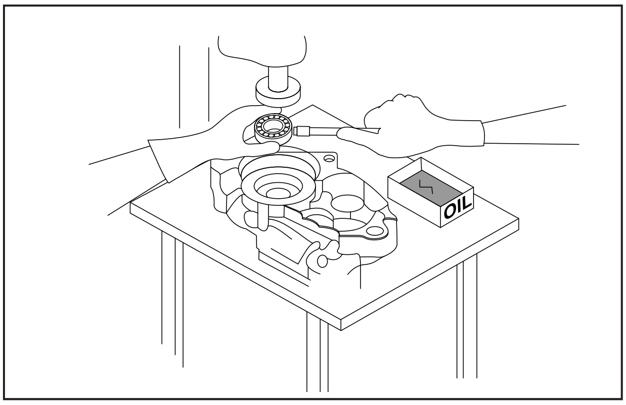
1.5.8. Disassembly/Assembly Sequence

Follow the disassembling and assembling sequence as given in the respective sections of this manual. In most cases assembly order is the reverse of disassembly. However, please follow the sequence provided in this service manual. If correct sequence is not followed, parts can be damaged.



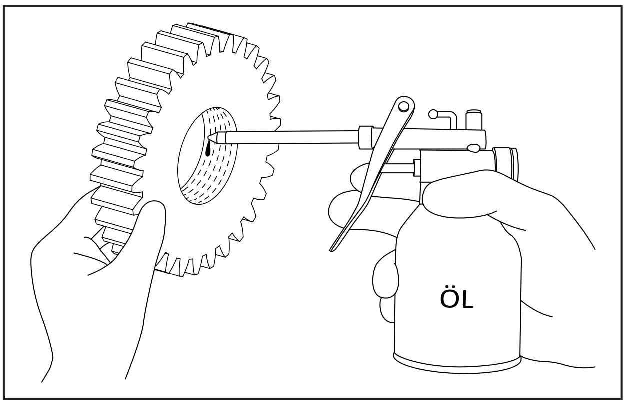
Removal of Bearings and Seals and fitting them in place

While removing bearings and seals, use correct tools mentioned in the relevant sections. Do not use excess force as it may damage parts. Similarly, while pressing bearings and seals in place lubricate them, use correct tools and visually examine if they are fitted in proper place. Bearings or seals should not be loose in the casing. Use of wrong tools, too much hammering or application of extra force may lead to damage of the bearings and seals.



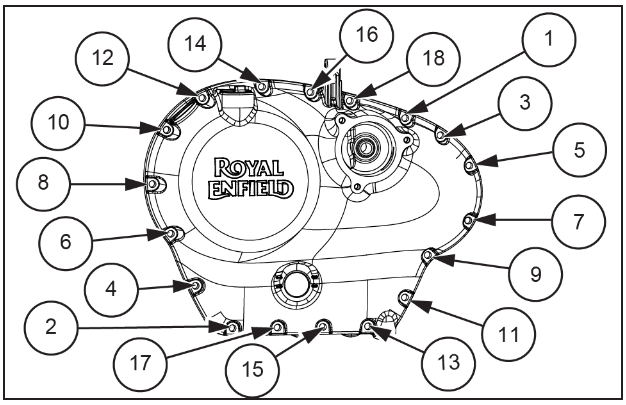
Lubrication

During assembly, ensure that all rotating and/or sliding parts are lubricated to minimize wear and tear during initial operation. Use Royal Enfield recommended oil and lubricants only. All brake system parts should be cleaned and lubricated with recommended brake fluid only (e.g., piston, MC, etc.).



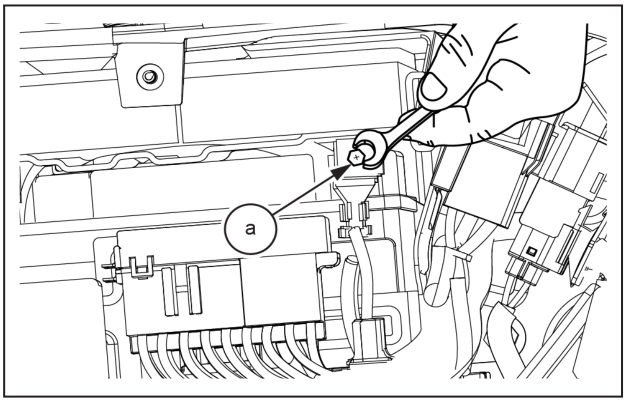
Tightening Sequence and Torque

The correct tightening sequence and torque has been provided in various sections of this service manual. Incorrect sequence or wrong torque will cause serious damage to parts.



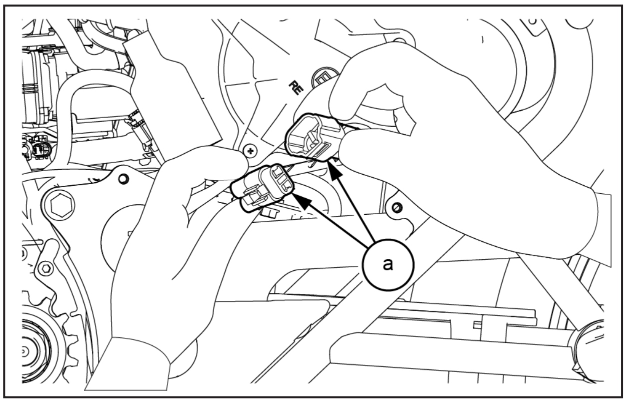
Battery Disconnection and Connection

When required, disconnect the battery cables from the battery. Disconnect the ground negative (−) terminal first and then positive (+) terminal to avoid short circuit. While connecting, first connect the positive (+) and then the negative (−) terminals.



Electrical Connectors

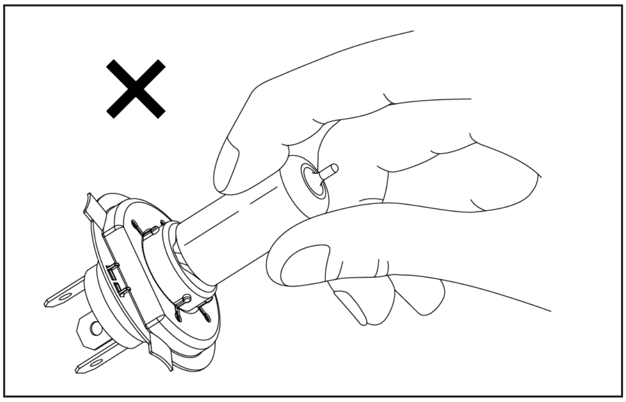
Ensure that lock is released in the connectors before disconnecting or connecting electrical connectors. Excessive force to pull out connectors without releasing the lock may damage the connector.



1.5.9. Safety

Handling Fragile Parts

Be careful while handling fragile parts like headlamp, indicator, bulb, etc. Use proper tools and do not apply undue force. After removing, store the parts in a safe place.



Welding

Royal Enfield does not recommend welding on the frame or any other parts of the motorcycle. Welding will make the frame weak and can also affect the balance of the motorcycle.

In motorcycles equipped with electronic control modules like EMS and ABS, welding will cause irreparable damage to the EMS/ABS system.

This will also void motorcycle warranty.

Tampering

It is illegal to tamper with the following:

a) Exhaust system
b) Fuel systems
c) Engine Number and/or VIN Information Plate
d) Wiring harness
e) Frame

This will lead to NON CONFORMANCE to the noise and emission regulations in force, causing serious performance issues besides irreparable damage to the motorcycle.

This will also void warranty of the motorcycle.

1.5.10. Storage of Removed Parts

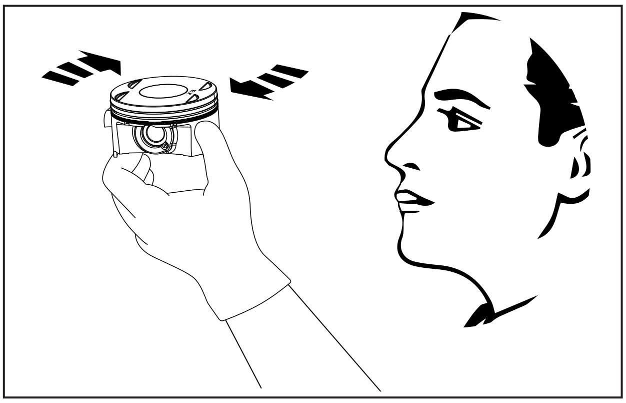
After disassembly of all parts including sub-assemblies, clean and store them in a separate storage bin to prevent from dust and place the parts near the working area.

Protective Covers

Use proper covers on the motorcycle to avoid scratching/damaging paint during service.

1.5.11. Inspection

Reuse of worn or damaged parts may lead to serious malfunction and/or unsafe operation of the motorcycle. All removed parts should be cleaned and visually inspected for wear-out, corrosion, discoloration, damage, etc. Refer to the appropriate sections of this manual for service limits on individual parts. If any wear or tear has been found or if the part is beyond its service limit, replace the parts with Royal Enfield Genuine parts.



1.5.12. General

One-time Parts/Consumables

In the service manual, we have listed parts that are for one-time use only. Replace and do not reuse parts such as:

a) Oil seals
b) Filters
c) Gaskets
d) Rubber washers
e) Cylinder head bolts
f) Connecting rod bolts
g) Crankcase bolts
h) O - Rings

Spares/Lubricants/Consumables

Ensure that you have all the spares/lubricants/consumables required for the servicing of a particular section stored near you for easy access. Use only Royal Enfield Genuine parts.

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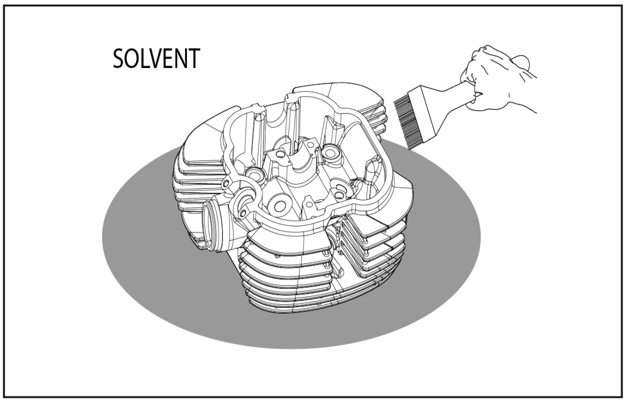
Genuine Parts

Solvents/Oils for Cleaning

Use correct solvents for cleaning to reduce fire hazards.



Hazardous Substances

Many liquids and other substances like fuel, lubricants, brake oil, adhesives, etc., used in automobiles are poisonous. Keep the fluids out of reach of children. Do not bring in contact with eyes and skin. Wash exposed skin thoroughly with soap and water. If any irritation persists, consult a doctor immediately.

Environmental Protection

Dispose used oil and other consumables like gaskets, O-rings, oil filters through authorized waste-disposal agencies.

Do not spill brake oil on painted parts. It will damage the paint.

Do not use mineral-based grease in brake parts as it will damage the hydraulic seals.

Gasoline/Petrol

Gasoline/Petrol is highly flammable. Be careful while removing the fuel tank and handling Gasoline/Petrol. Store it in a safe place and ensure it is stored in a well ventilated area, away from the work area and fire.

After-market Parts and Accessories

Royal Enfield strongly recommends use of Royal Enfield genuine parts and accessories only.

A list of all accessories available from Royal Enfield can be obtained from Royal Enfield dealers.

Yet, if you are using any after-market part that is not supplied by Royal Enfield, do ensure that it does not interfere with the functioning of any of the motorcycle parts.

Final Inspection

Once the repairs/servicing is done, check and confirm that all tasks mentioned on the job card have been performed. Do a proper testing to ensure that all critical functions are working properly, all reported issues have been resolved and no new problem has been introduced.

Follow the final inspection checklist and sign out through the final inspector.

1.5.13. Delivery to the Customer

Ensure that the customer is informed about all the repairs that have been carried out. Also let he/she know about the parts that have been replaced and consumed during the repairs. Demonstrate to the customer that all his/her reported issues have been resolved. Insist on a test ride if required.

Please preserve the parts. Show it to the customer and dispose it with the customer’s permission.

TECHNICAL SPECIFICATIONS

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2. Technical Specifications

2.1 Engine	
Engine Type	**Single Cylinder, 4 Stroke, SOHC**
Bore	**72 mm**
Stroke	**85.8 mm**
Swept Volume	**350cc**
Compression Ratio	**9.5:1**
Max Power	**15.06 kw @ 6100 RPM**
Max Torque	**27 N m @ 4000 RPM**
Idle RPM	**1050 ± 100 RPM**
Starting	**E-Start**
Air Filter Element	**Paper element**
Lubrication	**Forced lubrication, Wet sump with pump driver oil delivery**
Gear Box	**5 Speed Constant Mesh**
Engine Oil Tank Capacity	**Dry Fill:2.5 Liters / 0.55 Imperial gallon**
	Refill: 2.2 Liters / 0.48 Imperial gallon
Engine oil grade	**SAE 15W50 APISL, JASO MA2, SEMI SYNTHETIC**
Fuel Supply	**Fuel Injection**
Cooling	**Air cooling**

2.2 Ignition System	
Ignition	**ECU controlled with ECU map number)**
Ignition Advanced	**11.25˚ BTDC**
Spark Plug	**BOSCH M12 - YR7MES**
Spark Plug Gap	**0.7 mm to 0.8 mm**

2.3 Transmission	
Clutch	**Conventional Wet multiplate**
Primary Drive	**Gear**
Primary Ratio	**2.3:1**
Gear Box	**5 Speed Constant Mesh**
Gear Ratio	**2.615 :1** **1.706:1** **1.30:1** **1.040 :1** **0.875:1**
Secondary Drive	**Sprockets and Closed Chain (5/8" Pitch)**
Secondary Ratio	**2.80:1**

2.4 Chassis

Frame	**Twin Downtube Spine Frame**		
Suspension	**Front**	**Telescopic, 41 mm forks, 130 mm travel**	
	Rear	**Twin tube Emulsion shock absorbers with 6 step adjustable preload**	
Hydraulic Disc Brakes	**Front and Rear with ABS System**		
	Front	**300 mm disc, ABS**	
	Rear	**270 mm disc, ABS**	
	ABS	**BOSCH 9.1**	
Brake Fluid	**Grade**	**DOT 4**	
	Capacity	**Front: 50 ml**	**Rear: 100 ml**
Tyre size	**Front**	**100/90-19**	
	Rear	**140/70-17**	
Tyre Pressure		**Solo**	**With Pillion**
	Front	**32 psi/2.20 kg/cm^2**	**32 psi/2.20 kg/cm^2**
	Rear	**32 psi/2.53 kg/cm^2**	**36 psi/2.74 kg/cm^2**
Steering Lock	**Integrated with Ignition Lock**		
Fuel	**Petrol upto E10 minimum**		
Induction	**Fuel Injected**		
Fuel tank capacity	**15 ± 0.5 * Liters/3.3* Imperial Gallons**		
Low Fuel Warning	**5 ± 0.5* Liters/1.1* Imperial Gallons**		
Dead Stock	**950± 50 * ml /0.22* Imperial Gallons**		
The above values are approximate and the actual fuel filling capacity will vary from the values mentioned.			

2.5 Electrical System

System	**12V - DC**
Generation	**Alternator**
Alternator Output	**156 Watts @ 1100 RPM**
Battery	**12V, 8 Ah VRLA**
Headlamp	**12V, H4-60/55W (Halogen)with LED light guide**
Brake/Tail Lamp	**12V, LED type - 2.4/1.2W**
Turn Signal	**12V, 10W X 2 nos**
Instrument Cluster	**Digital instrument cluster with LCD**
Horn	**Single tone - 1<95 - 2.5 A**
Starter Motor	**12V, 0.7 kW**

⚠ WARNING

Using bulbs/other electrical gadgets other than specified rating may lead to over loading/erratic behavior/premature failure of electrical system. Modifications on the motorcycle which are not approved by Royal Enfield may not only disqualify for warranty, but will also affects the performance of the motorcycle.

2.6 Dimensions

Rake	**24˚(degrees)**
Front Wheel Rim	**19 M/C x MT 2.50**
Rear Wheel Rim	**17 M/C x MT 3.50**
Length	**2140 mm**
Width	**845 mm**
Height	**1140 mm**
Wheel base	**1400 mm**
Ground Clearance	**170 mm**

2.7 Weights

Kerb weight (90% fuel & Oil)	**191 Kg**
Max. pay load (Inclusive of rider mass)	**375kg**

- Values/Dimensions given above are for your guidance only.
- In view of continuous improvements being done on our products, the specifications could change without prior notice.

2.8 Recommended Lubricants

Engine Oil	Grade	**SAE 15W50 APISL, JASO MA2, SEMI SYNTHETIC**	
	Capacity	**1st Dry fill**	**2.2 Litres (Approx.)**
		Refill	**1.7 Litres (Approx.)**
Front Fork Oil	Grade	**Royal Enfield Front Fork Oil (or Gabriel Fork Oil 2W 25 HPCL)**	
	Capacity	**453cc/fork**	
Brake Fluid	Grade	**DOT 4 or above**	
	Capacity	**Front : 87 ml Rear : 54 ml**	

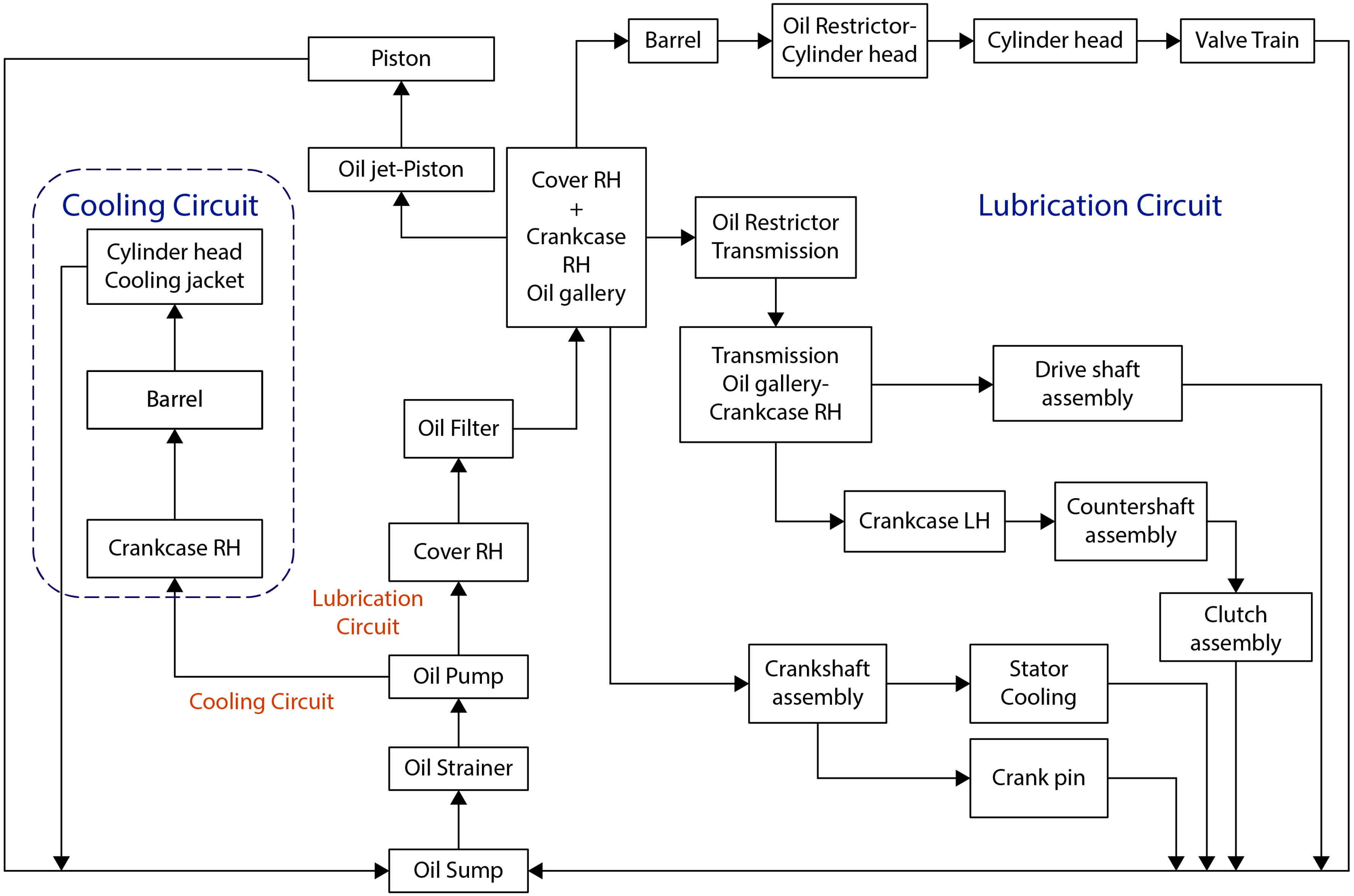
⚠ CAUTION

Use of wrong grade oil will reduce the life of the moving parts and seriously affect performance.

NOTE

- *DO NOT Mix DOT 4 or other brake fluids together.*
- *Recommendation is subject to change without notice.*

Engine Oil Lubrication Flow


Piston
Barrel
Oil Restrictor-
Cylinder head
Cylinder head
Valve Train
Oil jet-Piston
Cover RH
+
Crankcase
RH
Oil gallery
Cooling Circuit
Cylinder head
Cooling jacket
Barrel
Crankcase RH
Oil Restrictor
Transmission
Lubrication Circuit
Transmission
Oil gallery-
Crankcase RH
Drive shaft
assembly
Oil Filter
Cover RH
Crankcase LH
Countershaft
assembly
Clutch
assembly
Lubrication
Circuit
Oil Pump
Cooling Circuit
Crankshaft
assembly
Stator
Cooling
Oil Strainer
Crank pin
Oil Sump

Oil Circuit

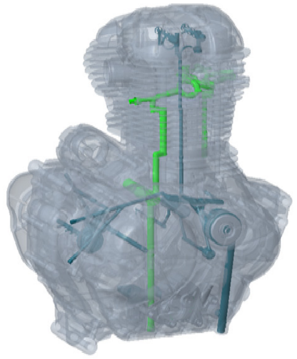


Fig. 2.8.1

Lubrication and Cooling Oil Circuit

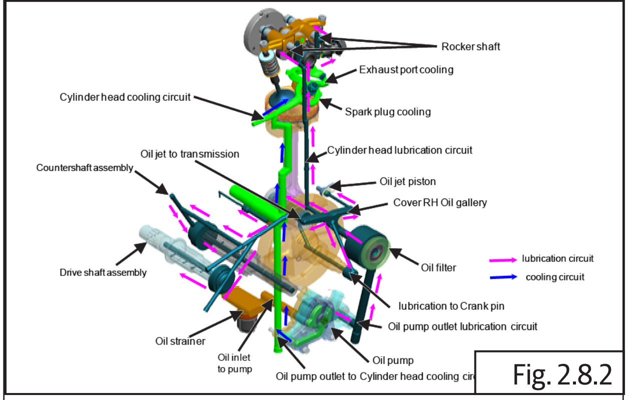

Rocker shaft
Exhaust port cooling
Cylinder head cooling circuit
Spark plug cooling
Oil jet to transmission
Cylinder head lubrication circuit
Countershaft assembly
Oil jet piston
Cover RH Oil gallery
Drive shaft assembly
Oil filter
lubrication circuit
cooling circuit
lubrication to Crank pin
Oil pump outlet lubrication circuit
Oil strainer
Oil inlet to pump
Oil pump
Oil pump outlet to Cylinder head cooling cir

Fig. 2.8.2

Crankcase Oil Circuit

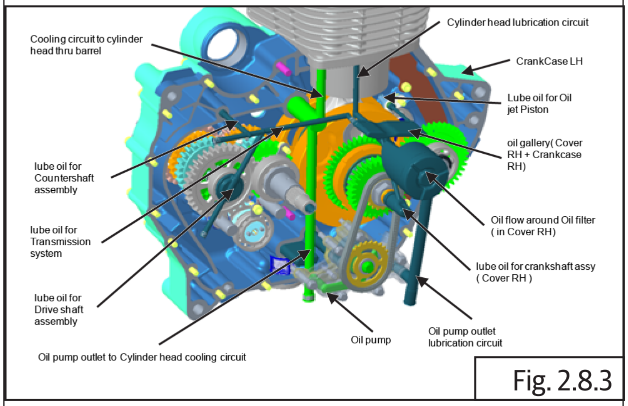

Cylinder head lubrication circuit
Cooling circuit to cylinder head thru barrel
CrankCase LH
Lube oil for Oil jet Piston
oil gallery(Cover RH + Crankcase RH)
lube oil for Countershaft assembly
Oil flow around Oil filter (in Cover RH)
lube oil for Transmission system
lube oil for crankshaft assy (Cover RH)
lube oil for Drive shaft assembly
Oil pump
Oil pump outlet lubrication circuit
Oil pump outlet to Cylinder head cooling circuit

Fig. 2.8.3

LH Crankcase Oil Circuit

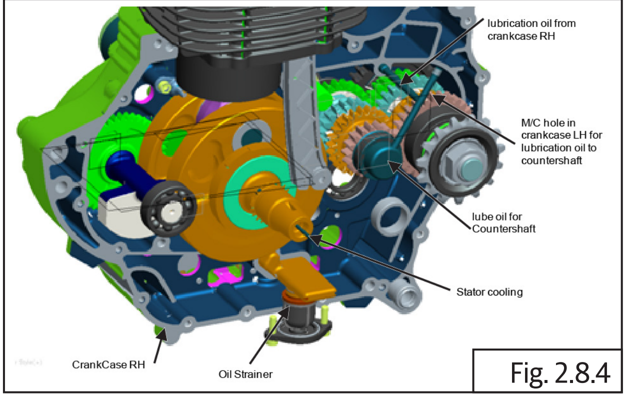

lubrication oil from crankcase RH
M/C hole in crankcase LH for lubrication oil to countershaft
lube oil for Countershaft
Stator cooling
CrankCase RH
Oil Strainer

Fig. 2.8.4

RH Crankcase Oil Circuit

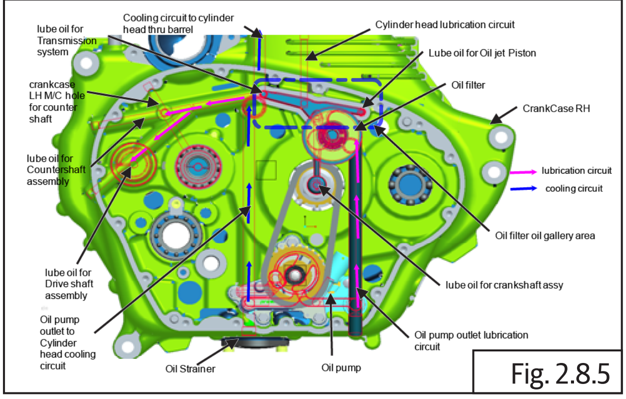

lube oil for Transmission system
Cooling circuit to cylinder head thru barrel
Cylinder head lubrication circuit
Lube oil for Oil jet Piston
crankcase LH M/C hole for counter shaft
Oil filter
CrankCase RH
lube oil for Countershaft assembly
lubrication circuit
cooling circuit
Oil filter oil gallery area
lube oil for Drive shaft assembly
lube oil for crankshaft assy
Oil pump outlet to Cylinder head cooling circuit
Oil pump outlet lubrication circuit
Oil Strainer
Oil pump

Fig. 2.8.5

Cylinder Head Oil Circuit

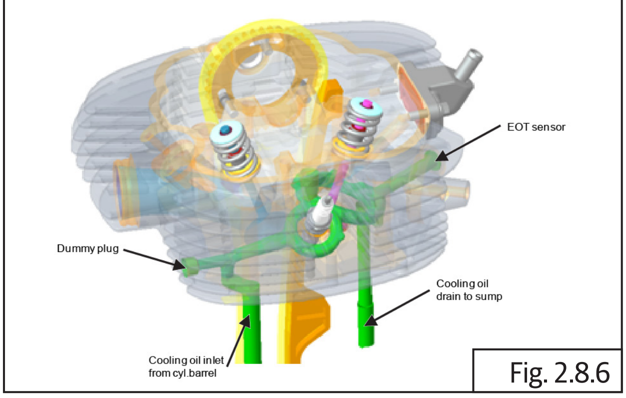

EOT sensor
Dummy plug
Cooling oil drain to sump
Cooling oil inlet from cyl.barrel

Fig. 2.8.6

Cylinder Head Oil Circuit

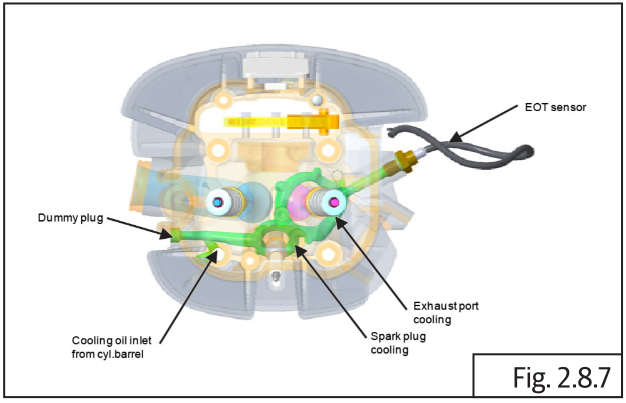

EOT sensor
Dummy plug
Exhaust port cooling
Spark plug cooling
Cooling oil inlet from cyl.barrel

Fig. 2.8.7

Rocker Carrier Oil Circuit

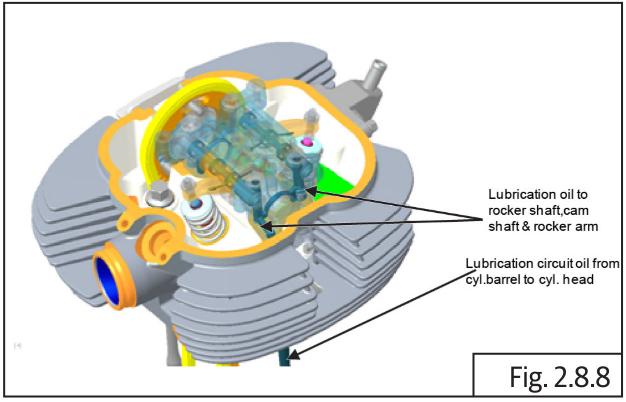

Lubrication oil to rocker shaft,cam shaft & rocker arm
Lubrication circuit oil from cyl.barrel to cyl. head

Fig. 2.8.8

PERIODIC MAINTENANCE SCHEDULE (PMS)

3. Periodical Maintenance Schedule (PMS)

The maintenance schedule detailed here will help you maintain your METEOR 350 Motorcycle meticulously and to get a long trouble free service. The schedule provided herein is based upon average riding conditions and indicates the Kms at which regular inspections, adjustments, replacements and lubrications are to be carried out. The frequency of the maintenance must be shortened depending upon the severity of the driving condition or if the motorcycle is used in a very dusty environment.

Sl. No.	**Description**	**Periodic Maintenance**										
	km (x 1000)	**0.5**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
	Months	**1.5**	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**
1	Engine oil (level check / replace) (#)	R	I	R	I	R	I	R	I	RI		R
		Check level at every 1000 km or earlier and top up as required										
2	Engine oil filter element (#)	R		R		R		R		R		R
3	Inlet and Exhaust valve clearance(**)	I&A		I&A		I&A		I&A		I&A		I&A
4	Engine oil stainer in LH crankcase	C		C		C		C		C		C
5	Spark plug			C&A		R		C&A		R		C&A
6	HT lead for crack	I	I	I	I	I	I	I	I	I	I	I
7	Rubber hose, Air filter to throttle body	I	I	I	I	I	I	I	I	I	I	I
8	Rubber hose, Inlet manifold/ Adapter	I	I	I	I	I	I	I	I	I	I	I
9	Evaporative Emission Equipment rubber hoses	I	I	I	I	I	I	I	I	RI		I
10	Fuel filter in fuel pump							R				
11	Air filter element		CC	R	C	R		CRC		RC		R
		Clean/replace more frequently if operated in dusty condition										
12	Vent Pipe under air filter box	I	I	I	I	I	I	I	I	I	I	
13	Hose - Secondary Air Injection	I	I	I	I	I	I	I	I	I	I	I
14	Throttle cable free play	Adjust every 5000 kms. or earlier if required.										
15	Clutch Cable / lever free play	Adjust every 1000 kms or earlier if required. Replace cable if necessary.										

I - Inspect (Clean and lubricate if necessary) A - Adjust(If Necesary) L - Lubricate R - Replace C - Clean
(#) - After First service, Engine oil and Engine oil filter replacement is a mandatory at every 12 months even the vehicle has not covered the specified kms.
(**)- Valve clearance setting at First Service (500 km) and above mentioned internal service period instruction is mandatory

Sl. No.	Description	Periodic Maintenance										
	km (x 1000)	**0.5**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
	Months	**1.5**	**6**	**12**	**18**	**24**	**30**	**36**	**42**	**48**	**54**	**60**
16	Hand levers pivot point	Lubricate every 1000 kms or earlier as required										
17	Brake pads - Front and Rear	I	I	I	I	I	I	I	I	I	I	I
18	Disc Brake fluid level - Front and Rear	I	I	I	I	R	I	I	I	R	I	I
19	Pivot-side stand, main stand, pillion footrest, gear shifter, brake pedal and levers	L	L	L	L	L	L	L	L	LL		L
20	Brake hose and Banjo Bolt - Front and Rear	I	I	I	I	I	I	I	I	I	I	I
21	Front Fork oil / leak	I	II		I	R	I	I	I	R	I	
22	Steering ball races play	Inspect and Adjust, if required lubricate every 5000 kms. Replace if necessary										
23	Rear Wheel Drive Chain	Clean, lubricate every 1000 kms. / clean, lubricate & adjust every 5000 kms. or earlier as required										
24	Rear Wheel Cush rubbers					I&R				I&R		
25	Wheel rim run out Front and Rear	I		I		I		I		I		I
26	Battery terminals (apply petroleum jelly)	C	CC		C	C	C	C	C	CC		
27	Side stand switch	I	I	I	I	I	I	I	I	I	I	I
28	Earth wire eyelet tightness					I						
29	Tyre wear pattern Front and Rear	I	I	I	I	I	I	I	I	I	I	I
30	Pivot - Side Stand, Center Stand	L	L	L	L	L	L	L	L	LL		L
31	Rider and Pillion Foot rest pivot	L	L	L	L	L	L	L	L	LL		L
32	All mounting fasteners in vehicle for tightness	I	I	I	I	I	I	I	I	I	I	I

I - Inspect (Clean, Adjust, lubricate or replace if necessary) L - Lubricate R - Replace C - Clean

(#) - After First service, Engine oil and Engine oil filter replacement is a mandatory at every 12 months even the vehicle has not covered the specified kms.

(**)- After First service, Valve clearnace adjustment is a mandatory at every 12 months even the vehicle has not covered the specified kms.

NOTE

- *For Maintenance after 50,000 kms, Please repeat the same frequency specified above, in consultation with a Royal Enfield Authorized Dealer/Service Center.*

GENERAL AND SPECIAL TOOLS

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4.2 Measurement Tools 37

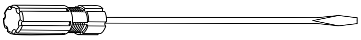
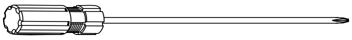
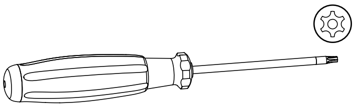
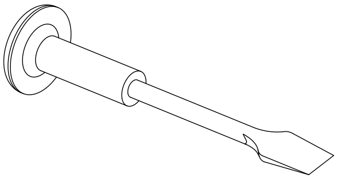
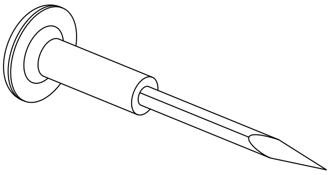
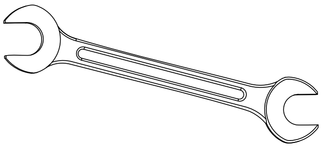
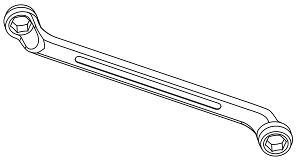
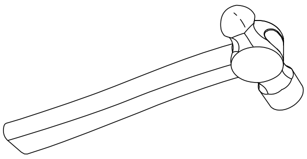
4.3 Special Tools 39

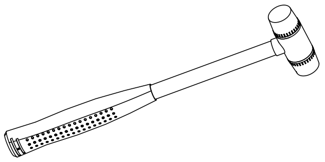
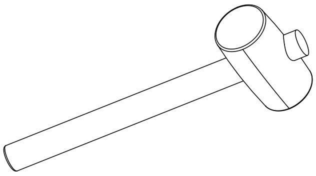
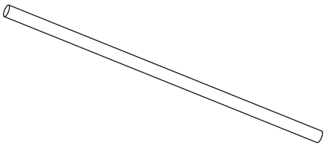
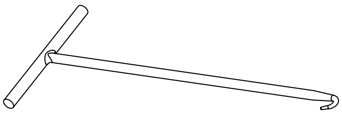
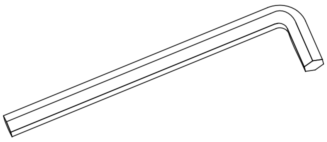
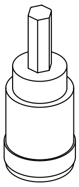
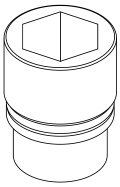
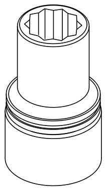
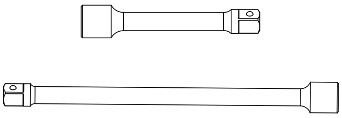
4.3.1. Engine 39

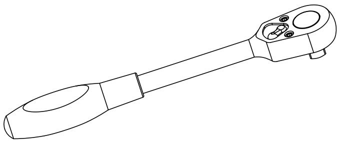
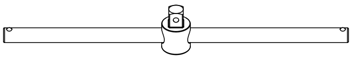
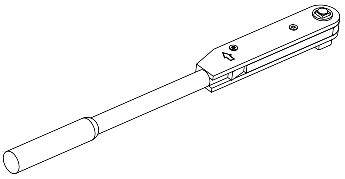
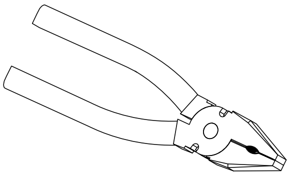
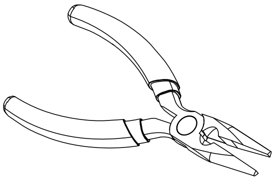
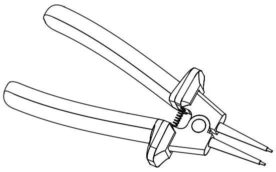
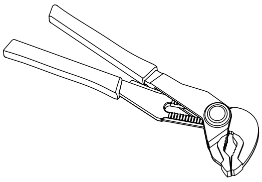
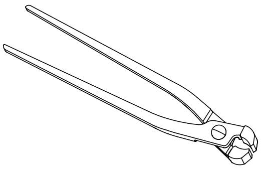
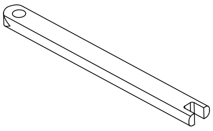
4.3.2. Vehicle 40

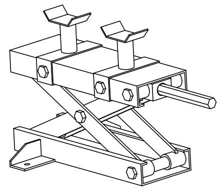
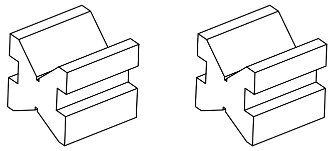
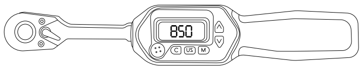
4. General and Special Tools

4.1 General Tools

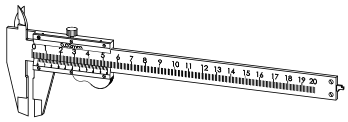
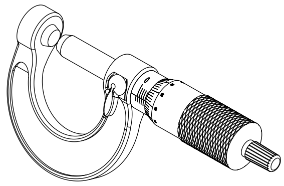
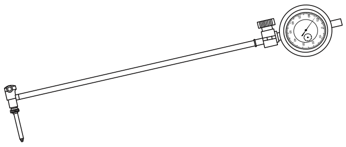
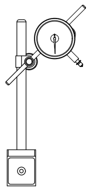
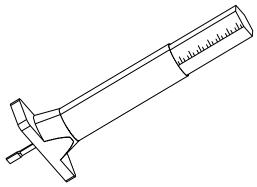
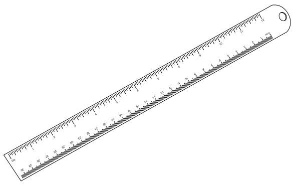
Sl. No.	Size	Part Description	Illustration
1	100 - 225mm	Screw Driver	
2	100 - 225mm	Screw Driver Phillips	
3	T20	Screw Driver (Torx)	
4	-	Chisel Flat	
5	-	Chisel Pointed	
6	6-7 to 26-27mm	Spanner (Double End/Open End)	
7	8-9 to 24-25mm	Spanner (Ring)	
8	-	Hammer	

Sl. No.	Size	Part Description	Illustration
9	-	Plastic Hammer	
10	-	Rubber Mallet	
11	-	Tommy Bar	
12	-	Spring Puller	
13	4 - 14mm	Allen Key	
14	4 - 14mm	Allen Socket	
15	8 to 30mm	Hex Socket	
16	12mm	Bi-hexagonal	
17	5" & 10"	Extension	

Sl. No.	Size	Part Description	Illustration
18	-	Ratchet	
19	-	T-handle	
20	10 - 50N-m & 22 - 100N-m	Torque Wrench	
21	-	Cutting Plier	
22	-	Nose Plier	
23	-	Circlip Plier	
24	-	Adjustable Plier	
25	-	Pinch Plier	
26	-	Spoke Adjuster	

Sl. No.	Size	Part Description	Illustration
27	-	Scissor Jack	
28	-	V-block	
29	10 N-m - 200 N-m	Digital Torque Wrench	

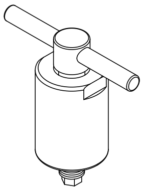
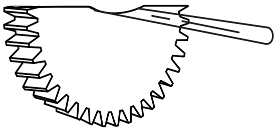
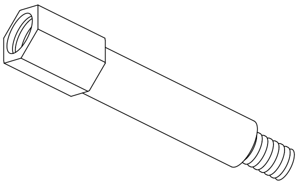
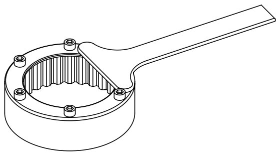
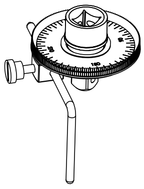
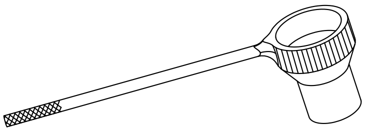
4.2 Measurement Tools

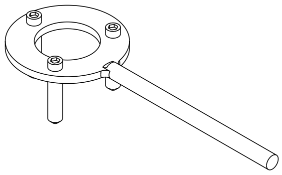
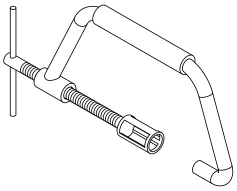
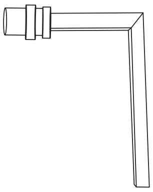
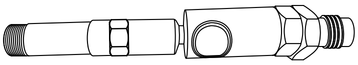
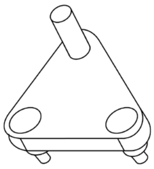
1	-	Vernier Caliper	
2	0 - 25mm, 25 - 50mm, 50 - 75mm, 75 - 100mm	Micrometer	
3	-	Bore Gauge	
4	-	Dial Gauge with Magnetic Stand	
5	-	Tyre Depth Gauge	
6	-	Steel Ruler	

SPECIAL TOOLS

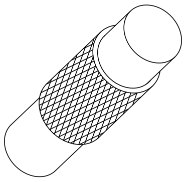
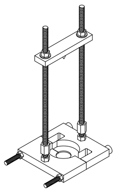
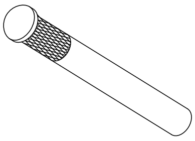
4.3 Special Tools

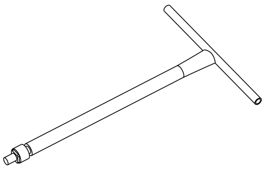
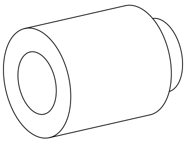
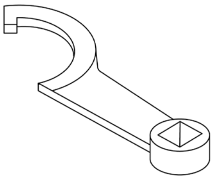
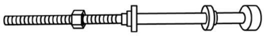
4.3.1. Engine

l. No.	Part Number	Part Description	Illustration
1	ST30274/a	Magneto Puller Assembly	
2	ST275332	Crank Gears Locking Tool	
3	ST30259/a	Adapter - Compression Checking	
4	ST30921/a	Clutch Holder	
5	ST-27562-1	Angular Torque Wrench	
6	ST-27527-2	Tappet Adjusting Tool	

SL. No.	Part Number	Part Description	Illustration
7	ST-27534-2	FD Sprocket Holding Tool	
8	ST-27528-2	Valve Spring Compressor	
9		Magnet Holder	
10		Oil Pressure Adapter	
11	ST30949/A	CAM timing TDC locking tool	

4.3.2. Vehicle

Sl. No.	Part Number	Part Description	Illustration
1	ST30273/a	Headstock - Frame Cone Installer	
2	ST30298/a	Bearing Puller, T -Stem	
3	ST30299/a	T Stem Taper Roller Bearing Installer	

4	ST26461-2	Fork Damper Tube Holder	
5	ST26485-3	Fork Oil Seal Installer	
6	ST30969/A	Steering Head Nut Adjuster	
7	ST31122/A	Swing Arm Bush Installer	

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5. ENGINE

5.1 Components Removal from Engine

⚠ WARNING

The engine and exhaust system get extremely hot during normal operation and direct contact with skin can cause serious burns. Make sure engine is in normal temperature (OR) cooled before starting operation.

NOTE

- *Ensure the motorcycle is upright on a firm and flat surface.*
- *Start the engine and allow the engine and oil to warm up for a few minutes and then turn it OFF to facilitate easy draining of oil.*

Click on the respective topic to go to the procedure of Removal and Installation.

5.1.1. Drain Plug

5.1.2. Oil Filter

5.1.3. Throttle Body

5.1.4. Injector

5.1.5. Spark Plug

5.1.6. Engine Oil Temperature Sensor

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5.2 Engine Removal from Main Frame

⚠ WARNING

The engine and exhaust system get extremely hot during normal operation and direct contact with skin can cause serious burns. Make sure engine is in normal temperature (OR) cooled before starting operation.

5.2.1. Engine Oil

NOTE

- *Ensure the motorcycle is placed on a firm flat surface, resting it on the center stand/ramp.*

- Before starting the dismantling process, start the engine and let the engine warm up for a few minutes and then turn it OFF.
- Remove engine oil filler cap **(a)**.

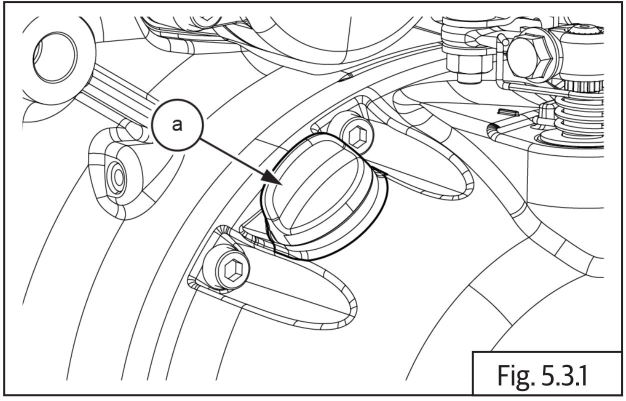
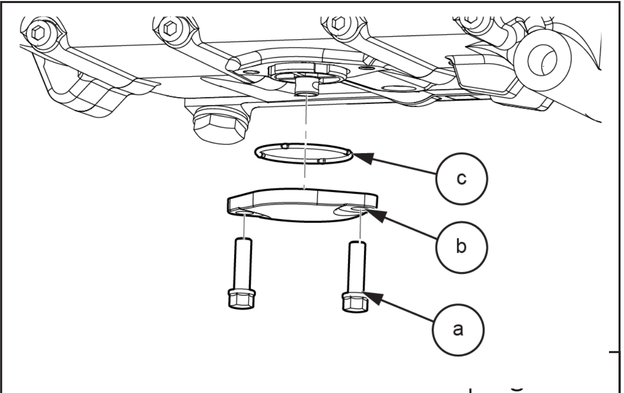


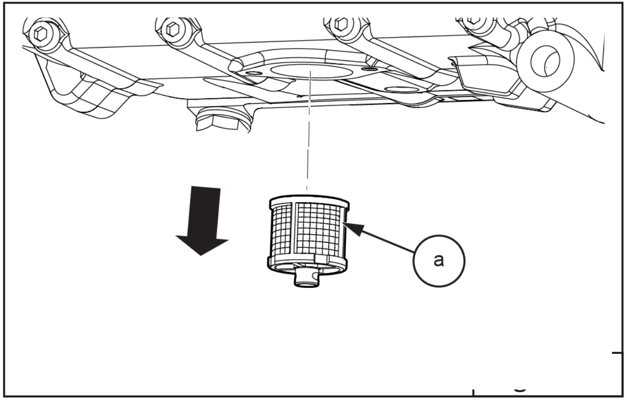
Fig. 5.3.1

- Place a tray under engine oil drain plug **(M6)**. Remove bolt **(a)** along with cap **(b)** and O-ring **(c).**



8 mm Socket with Ratchet

- Gently pull and remove stainer **(a).**



5.2.2. Oil Filter

- Place a tray under engine cover RH.
- Loosen and remove 3 Nos Hex soc bolt **(M6) (a)** from cover RH.

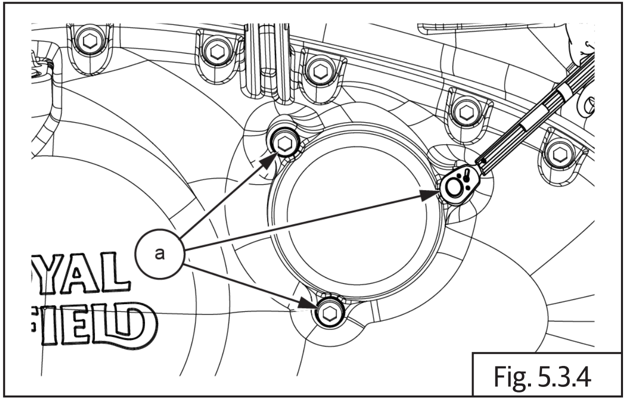


Fig. 5.3.4

8 mm Socket with Ratchet

- Gently remove oil filter cap **(a)** along with O-ring **(b)** and oil filter **(c)**.

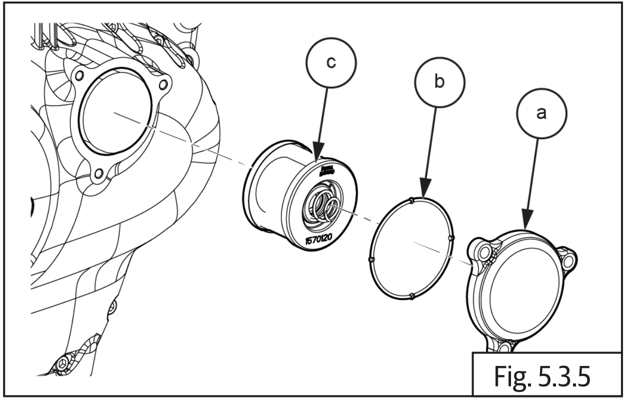


Fig. 5.3.5

5.2.3. Side Panel RH

- Insert ignition key **(a)** and turn clockwise to unlock and remove side panel RH **(b)** from motorcycle.

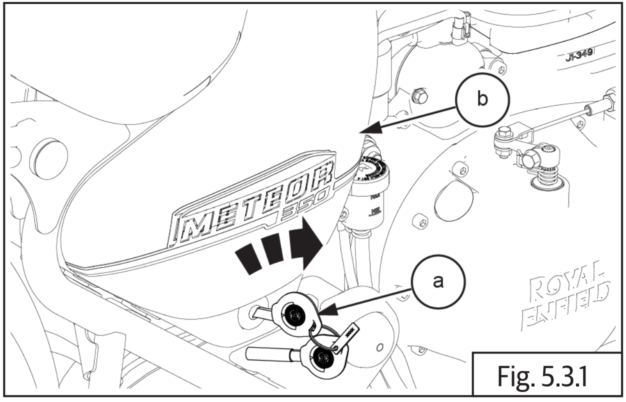

b
a
METEOR 350
ROYAL ENFIELD
JI-349

Fig. 5.3.1

5.2.4. Side Panel LH

- Loosen and remove bolts **(a)**.

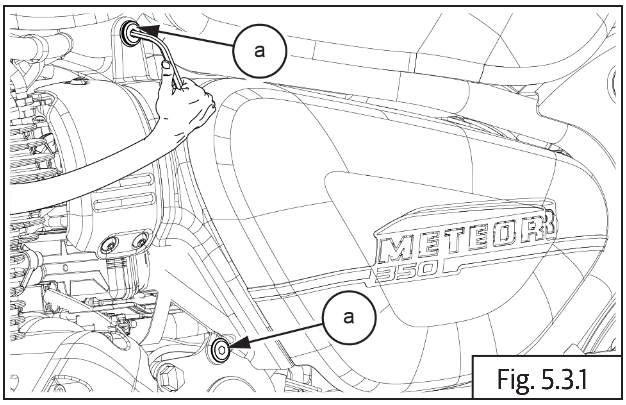

a
a
METEOR 350

Fig. 5.3.1

🔧	5 mm Allen Key

- Gently pull the LH cover **(a)** to remove.

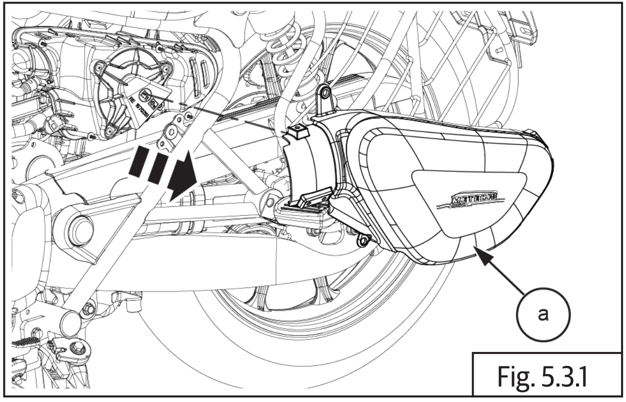


Fig. 5.3.1

5.2.5. Pillion Backrest and Seat from Frame

- Locate and remove 4 Nos hex soc bolts **(M6) (a)** behind the backrest.

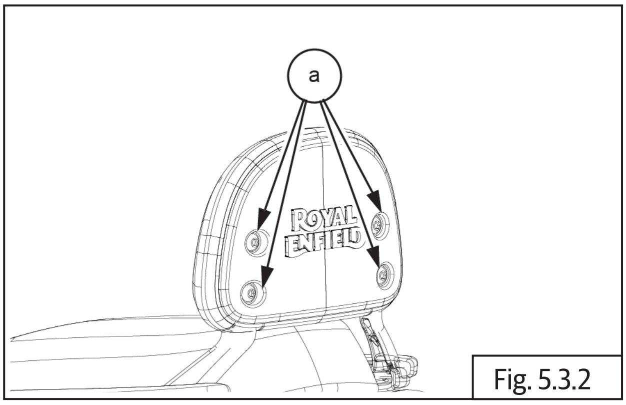

a
ROYAL ENFIELD

Fig. 5.3.2

🔧	5 mm Allen Key

- Remove backrest pad **(b)** along with the supporting pad **(a)** behind the backrest.

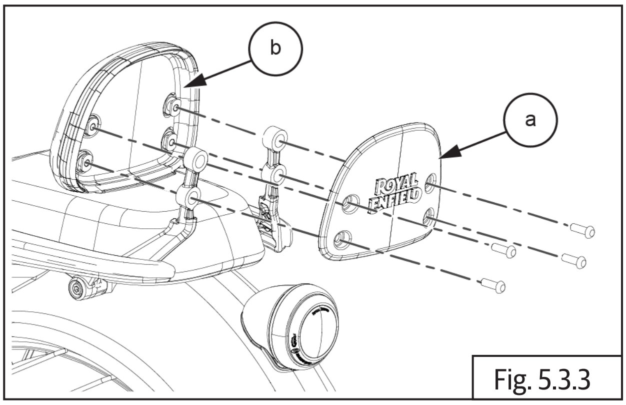

b
a
ROYAL ENFIELD

Fig. 5.3.3

- Locate and remove 4 Nos hex soc bolts **(M6) (a)** below the pillion seat.

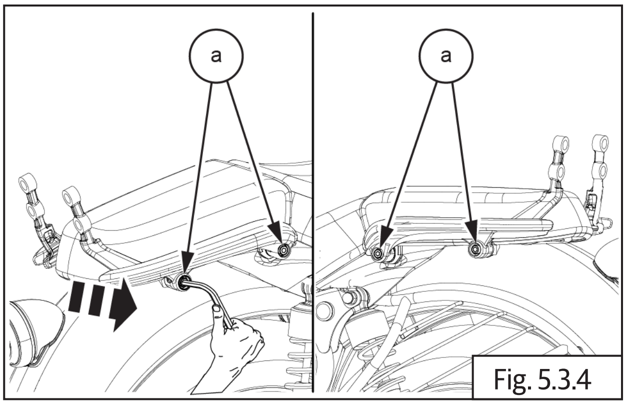


Fig. 5.3.4

🔧	6 mm Allen Key

- Remove the grab rail **(a)**.

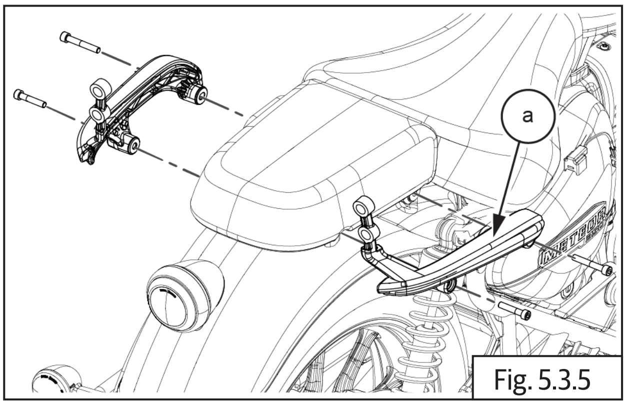


Fig. 5.3.5

- Gently lift the pillion seat **(a)** to remove.

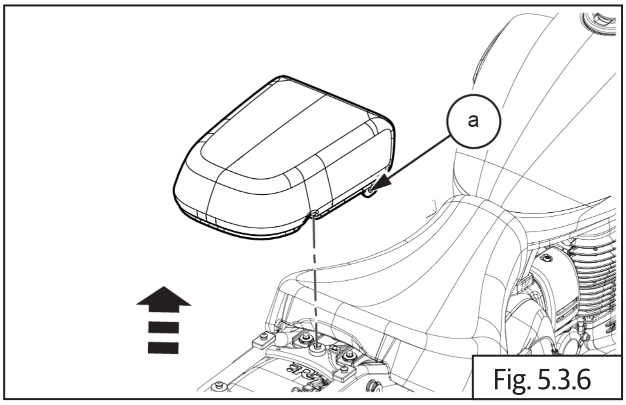


Fig. 5.3.6

5.2.6. Rider Seat from Frame

- Remove 2 Nos Hex soc bolt **(a)** **(M6)** along with spacer **(b)** and gromet **(c)**.

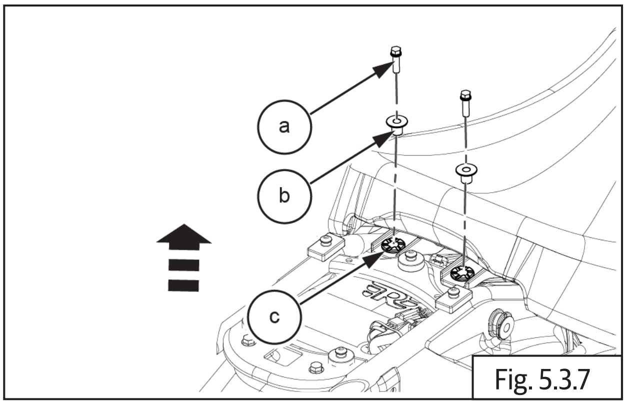


Fig. 5.3.7

🔧	10 mm Socket with Ratchet

- Gently lift and pull rider seat **(a)** from rear side of motorcycle.

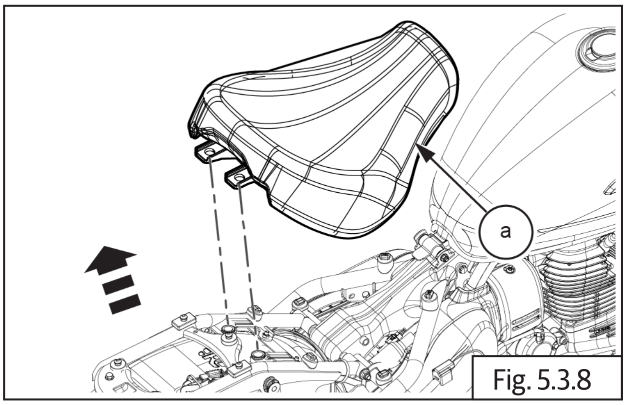


Fig. 5.3.8

NOTE

- *Place the seat in a safe location to prevent from scratches and dirt.*

5.2.7. Battery Connections

NOTE

- *Ensure ignition and stop switches are in OFF position before disconnecting battery cables.*

- Disconnect battery negative (-) terminal bolt **(a)**.

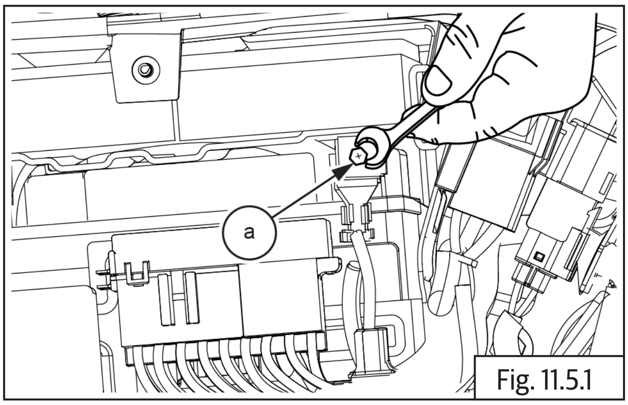


Fig. 11.5.1

🔧	10 mm Double end spanner

- Disconnect battery positive (+) terminal **(a)** from battery **(b)**.

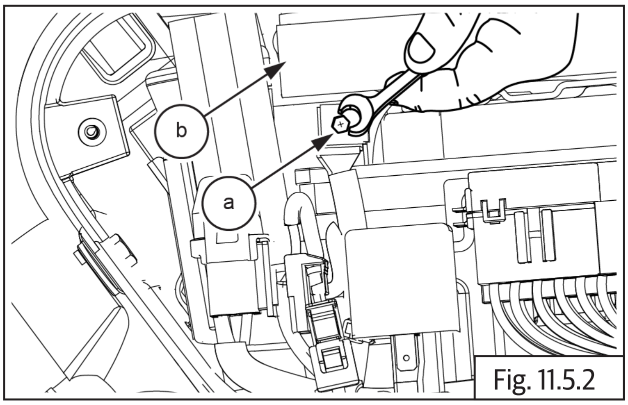


Fig. 11.5.2

	10 mm Double end spanner

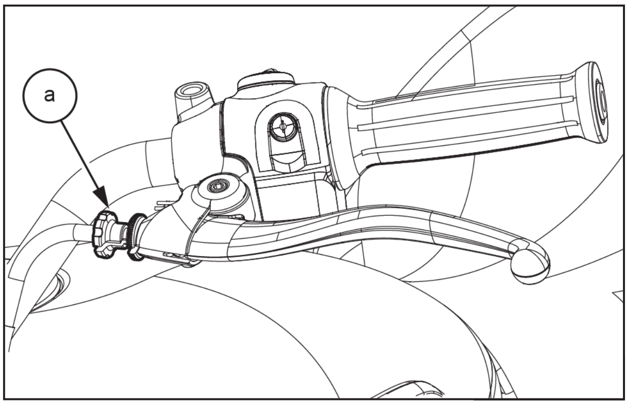
5.2.8. Clutch Cable

Cover RH End

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Ensure ignition switch and engine stop switch are in OFF position.
- Loosen lock nut and ensure adjuster **(a)** at the handlebar end is fully turned into the bracket LH to increase cable play.



- Loosen outer locknut **(M8) (a)** completely on the clutch cable adjuster at RH cover end and push clutch cable **(b)** into cable guide in cover RH to increase the free play of the inner cable.

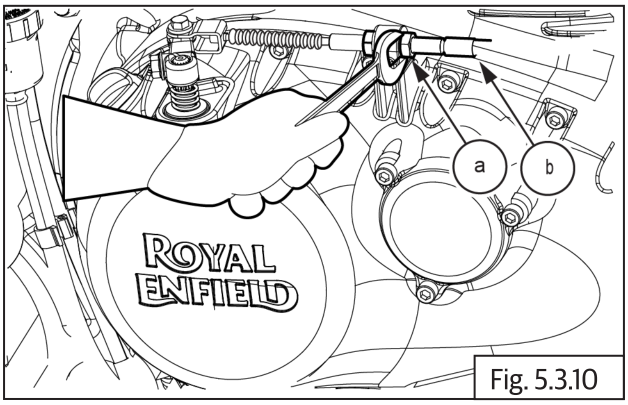


Fig. 5.3.10

	12 mm Double end spanner

- Gently push inner cable **(a)** into clevis **(b)** in clutch shaft **(c)** and remove cable through the slot in the clevis.

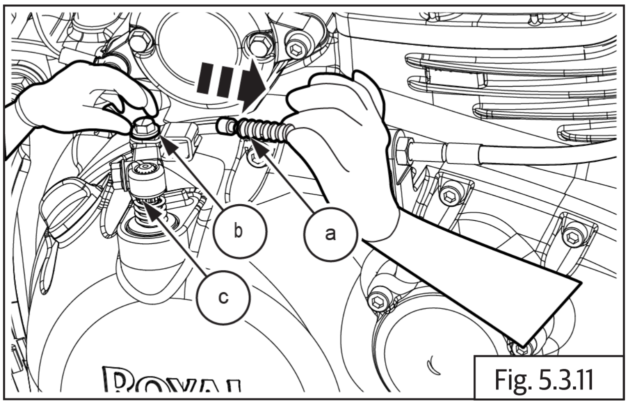


Fig. 5.3.11

- Remove protective rubber boot **(a)** from clutch cable **(b)**.

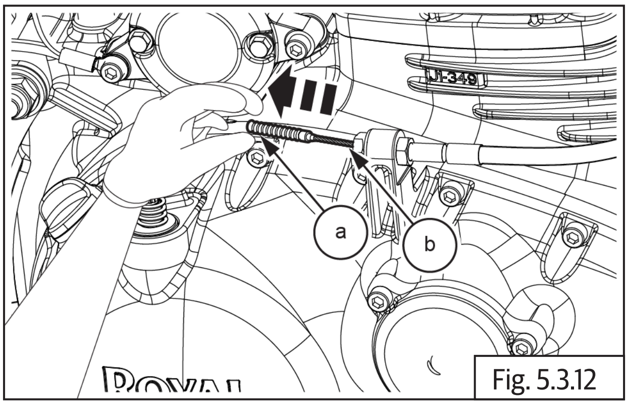


Fig. 5.3.12

- Loosen adjuster nut **(a)** completely from the clutch cable and remove.

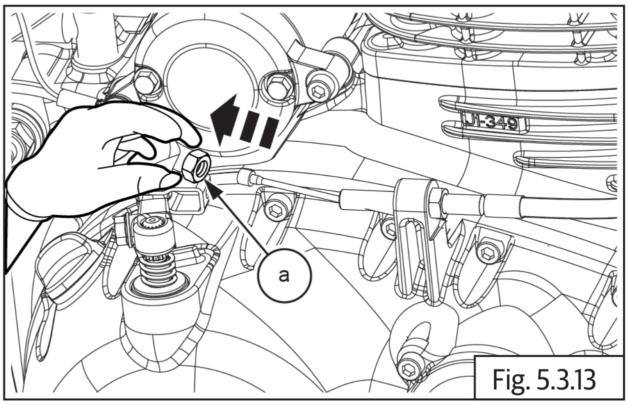


Fig. 5.3.13

- Gently pull out clutch cable assembly **(a)** from the cable guide **(b)** in cover RH assembly.

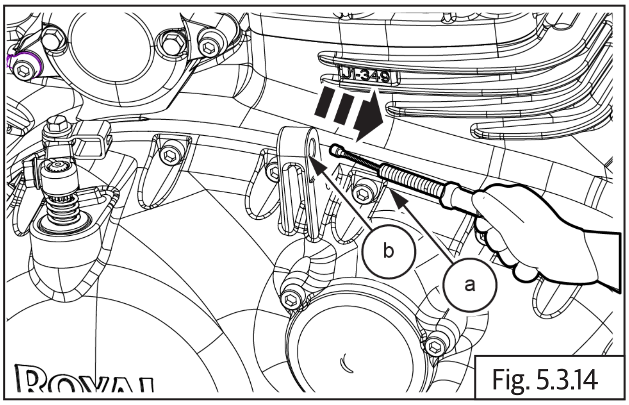


Fig. 5.3.14

5.2.9. Fuel Tank

- Ensure the ignition and stop switches are in OFF position.
- Remove the fuel tank cap. Drain fuel completely from fuel tank.
- Remove the following parts:
  - Remove side panel RH (section 6.7.1).
  - Remove rider seat (section 6.7.2).
- Loosen and remove 1 Nos. Hex head bolts **(M6)** **(a)** from rear end of fuel tank on frame **(b)**.

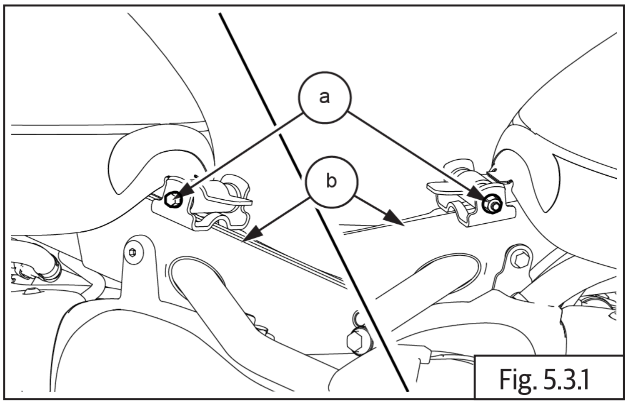


Fig. 5.3.1

	10 mm Socket with Ratchet

5.2.10. Fuel Pump Connector

- Gently lift fuel tank **(a)** upwards and pull backwards slightly.
- Disconnect fuel pump connector **(b)** from fuel tank.

⚠ CAUTION

DO NOT lift the tank too much to prevent damage to connectors and brake hoses.

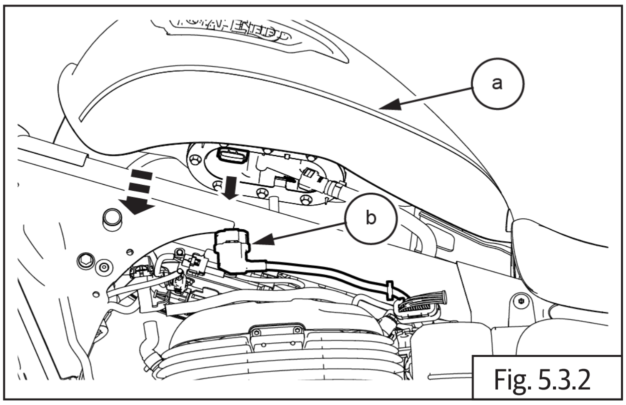


Fig. 5.3.2

5.2.11. Fuel Hose (Fuel Pump to Injector)

- Clean quick fix adapter area and disconnect by pressing lock button **(a)**. Remove fuel hose **(b)**.

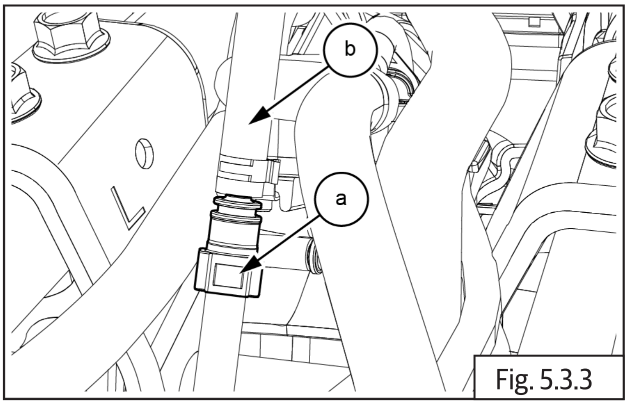


Fig. 5.3.3

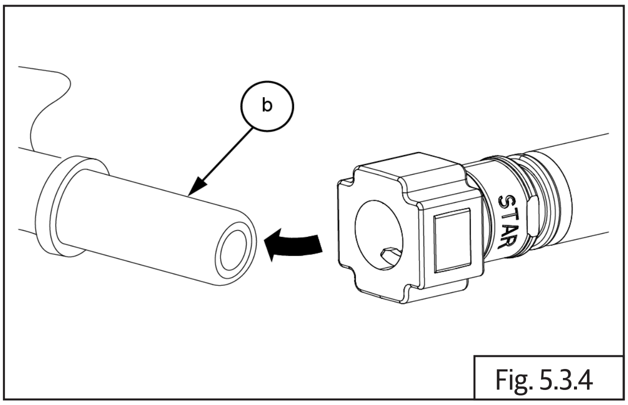


Fig. 5.3.4

5.2.12. EVAP Connections to Fuel Tank

- Disconnect EVAP connection hose **(a)** from fuel tank **(b)**.

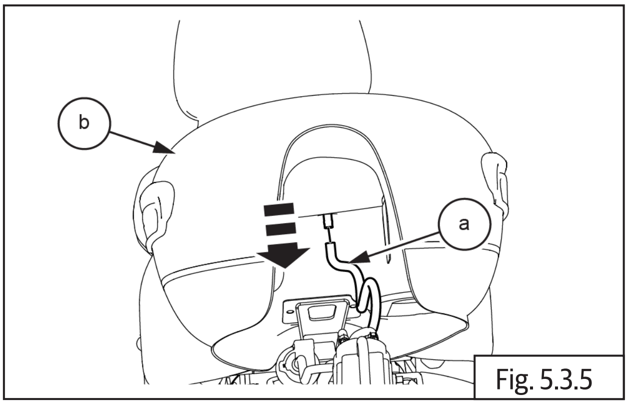


Fig. 5.3.5

5.2.13. Drain Hose

- Disconnect drain hose connection **(a)** from fuel tank **(b)**.

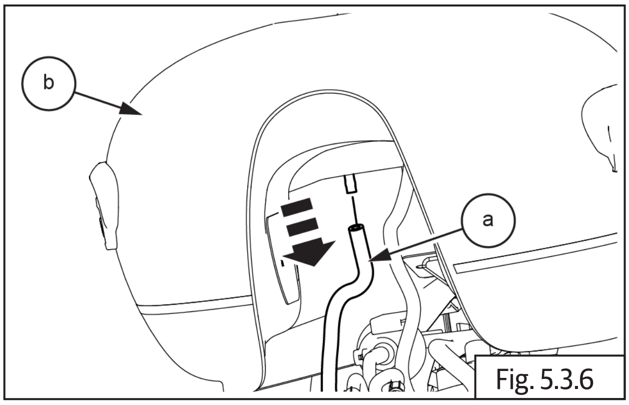


Fig. 5.3.6

5.2.14. Throttle Cable

Throttle Body End

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Ensure Ignition switch and Engine stop switch are in OFF position.
- Remove side panel LH (Section 6.7.1).
- Remove rider seat (Section 6.7.2).
- Loosen fuel tank assembly mountings (Section 7.1.1) and carefully slide and lift fuel tank up to access 2 clips holding the throttle cables to frame on RH side.

- Loosen 2 Nos. Hex nuts **(M8) (a)** fully on top of throttle cable bracket **(b)** to increase inner cable **(c)** free play.

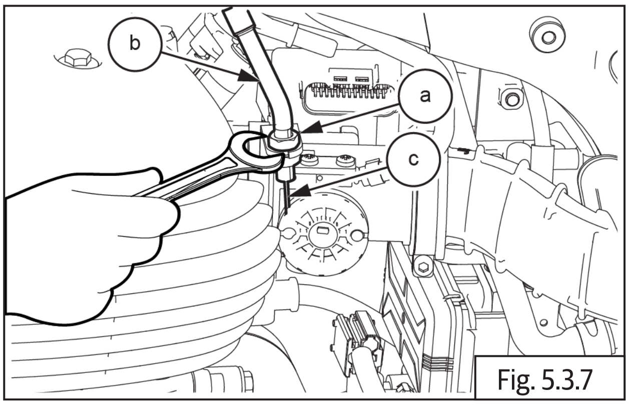


Fig. 5.3.7

🔧	10 mm Double end spanner

- Push cable adjusters fully into the bracket and loosen the 2 inner hex nuts **(a) (M6)** on the throttle cable adjusters.
- Ensure both inner nuts are free from the adjusters and gently pull out the adjuster of the inside cable till it is out of the bracket and slide the inner cable out through the slot in the bracket.

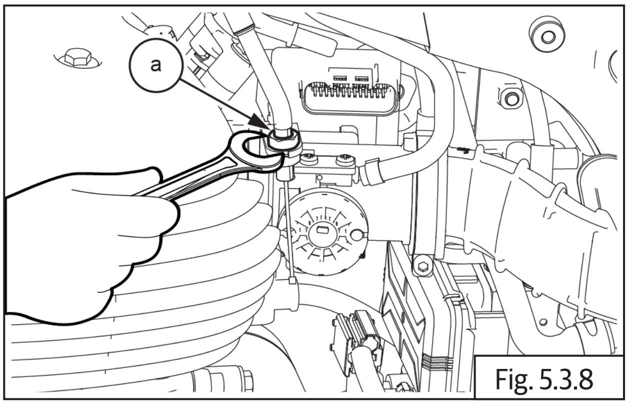


Fig. 5.3.8

5.2.15. Secondary Air Valve Connection

- Disconnect Reed valve hose **(a)** from front side of engine cylinder head.

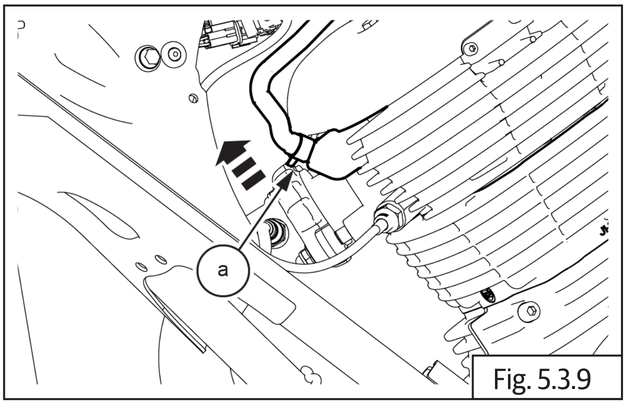


Fig. 5.3.9

5.2.16. Air Filter Housing to Throttle Body

- Remove 1 No. Allen bolt **(a)** from the throttle body clip **(b)**.

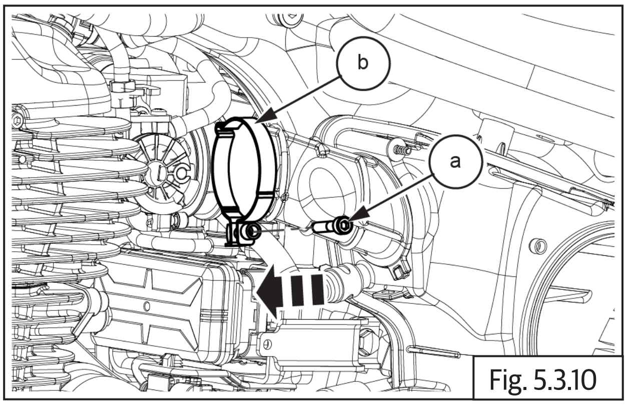


Fig. 5.3.10

🔧	4mm Allen Socket and Ratchet

5.2.17. Throttle Body

- Ensure throttle position sensor, manifold absolute pressure sensor and idle speed controller wiring connectors are disconnected.
- Disconnect the hoses **(a)** from canister purge valve.
- Loosen worm clip screws **(M5) (b)** to disconnect throttle body from inlet manifolds.

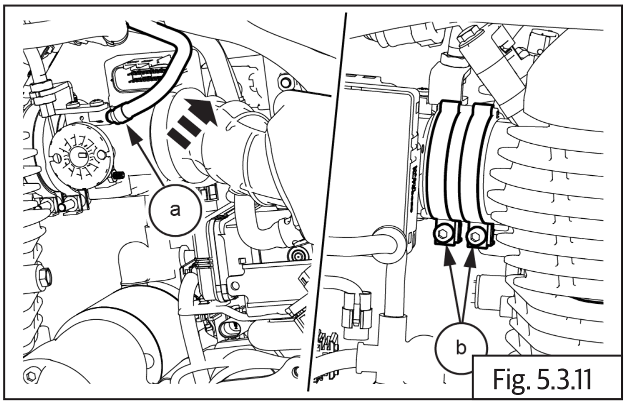


Fig. 5.3.11

🔧	4 mm Allen key

5.2.18. Hego/Oxygen Sensor Connectors

- Disconnect Hego/oxygen sensor connectors **(a)** from both LH and RH located on front side of engine.

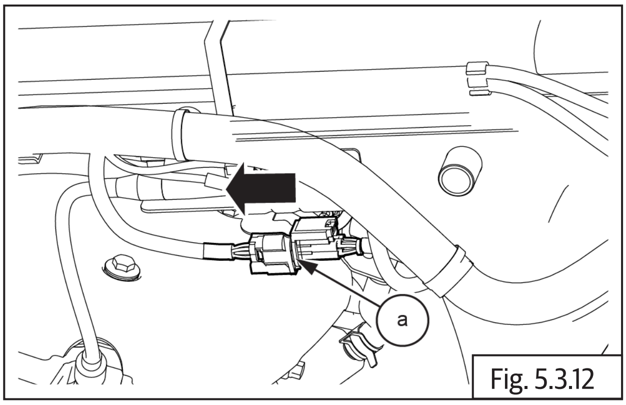


Fig. 5.3.12

5.2.19. Exhaust Pipe and Silencer

Silencer

- Loosen and remove 3 Nos. hex socket bolts **(M6)** **(a)** from the silencer guard at muffler end.

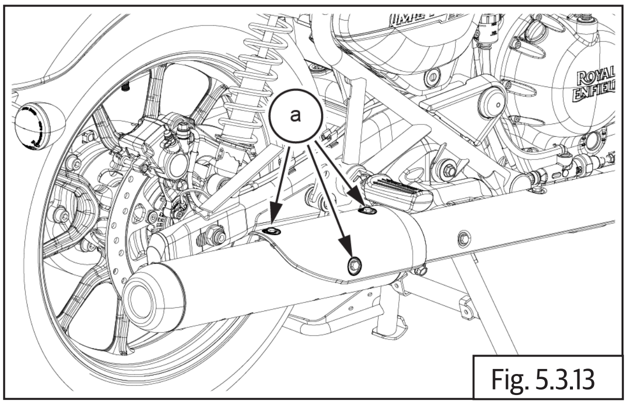


Fig. 5.3.13

🔧	10 mm socket with ratchet

- Remove silencer guard **(a)** along with bolts **(b)**.

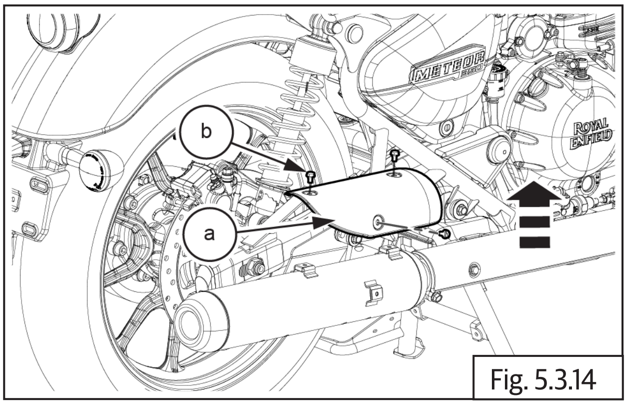


Fig. 5.3.14

- Remove 3 nos hex socket bolts **(a)** **(M6)** from silencer guard at the header pipe end.

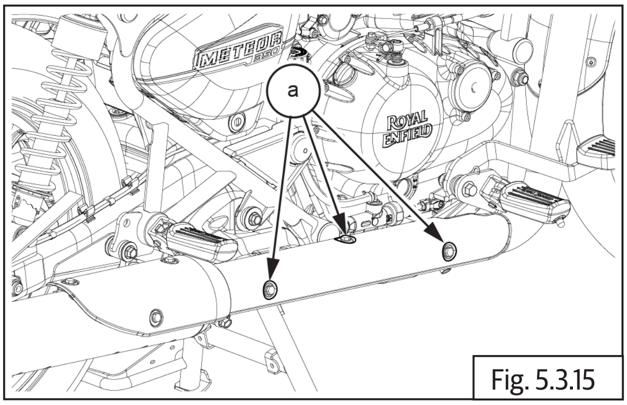


Fig. 5.3.15

🔧	10 mm socket with ratchet

- Remove the silencer guard along with bolts.

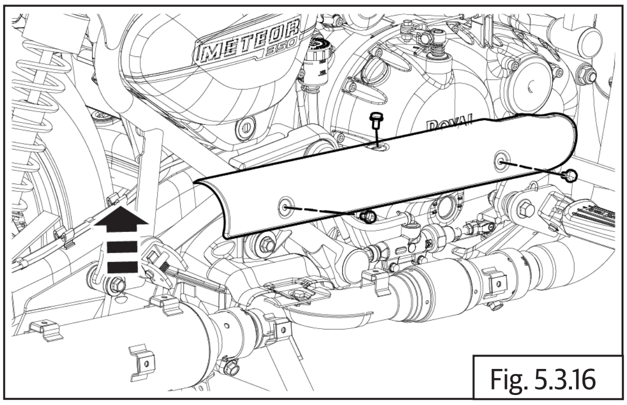


Fig. 5.3.16

- Remove the heder pipe mounting bolt **(a)** in the catalytic converter.

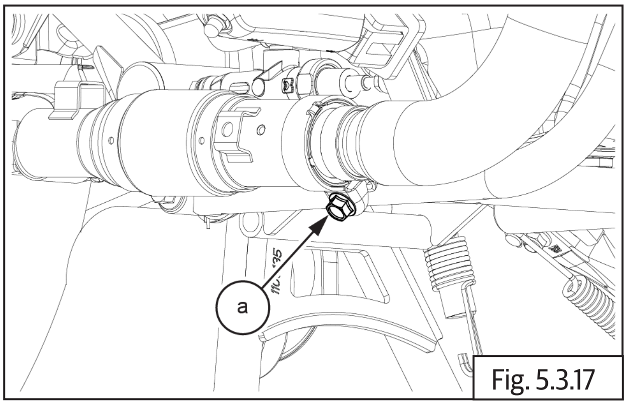


Fig. 5.3.17

12 mm socket with ratchet

- Remove silencer mounting from Catalytic coverter **(a)** and mounting bolt from frame **(b)**.

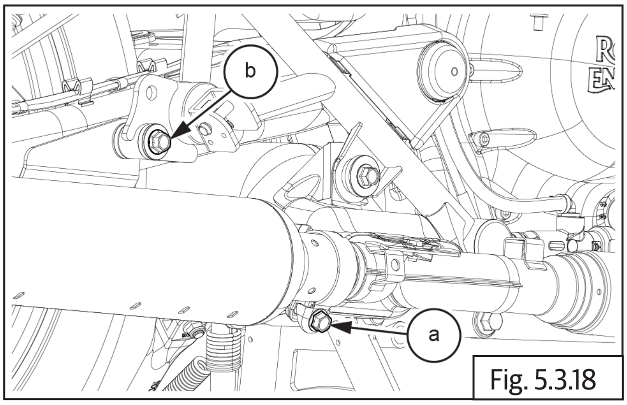


Fig. 5.3.18

12 mm socket with ratchet

- Gently pull the silencer outwards to remove.

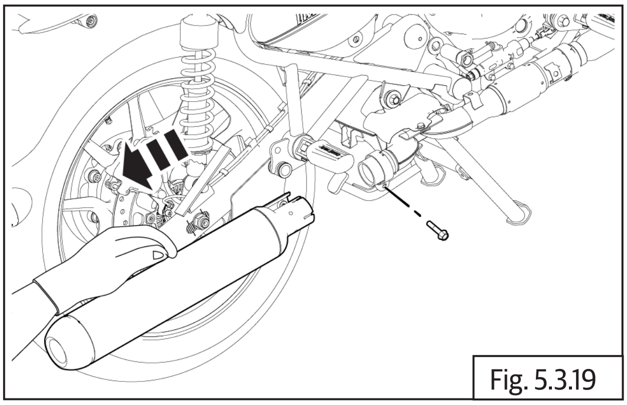


Fig. 5.3.19

7.4.1. Catalytic Converter

- Remove catalytic converter mounting bolt **(a) (M8)** along with washers **(b)** and rubber gromet **(c)**.

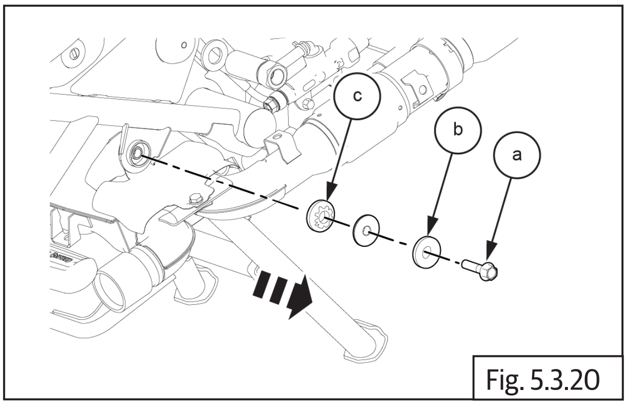


Fig. 5.3.20

12 mm socket with ratchet

- Remove the catalytic converter mounting bolt **(a) (M8)** along with two washers **(b)** and two rubber grommets **(c)** from left side of the frame.

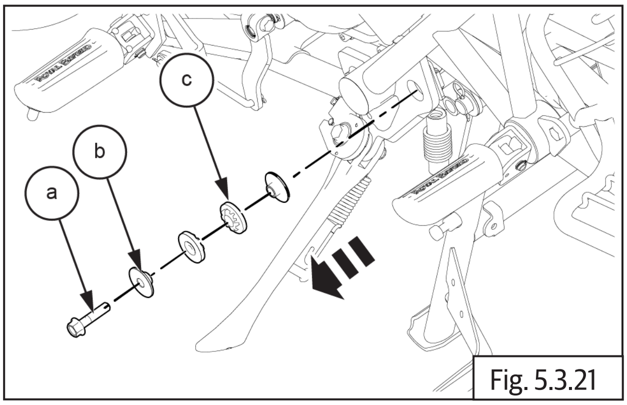


Fig. 5.3.21

12 mm socket with ratchet

- Gently remove the catalytic converter **(a)** from the frame

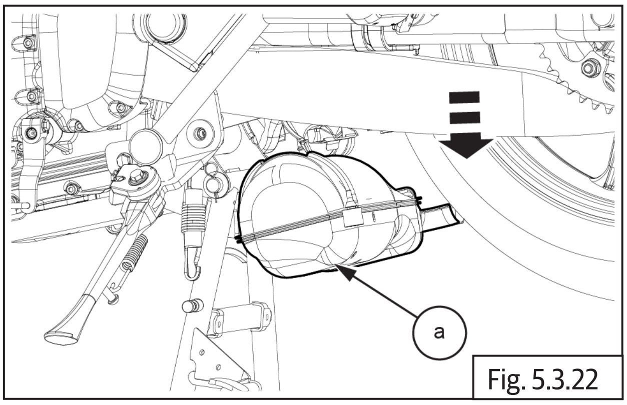


Fig. 5.3.22

7.4.2. Exhaust Header Pipe

- Remove 2 nos nuts **(a)** from the cylinder head assembly.

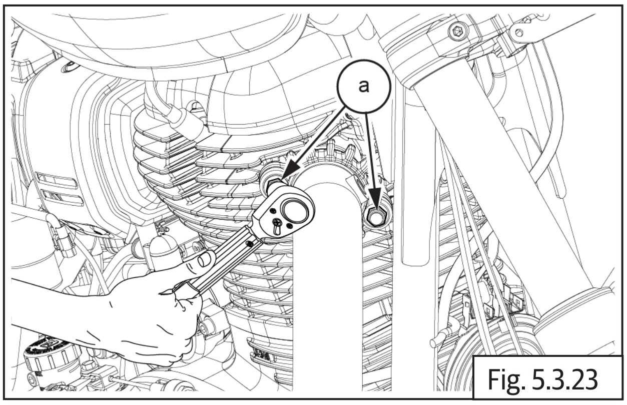


Fig. 5.3.23

	14 mm socket with ratchet

- Remove the exhaust header pipe along with 2 nos mounting fins **(a)**.

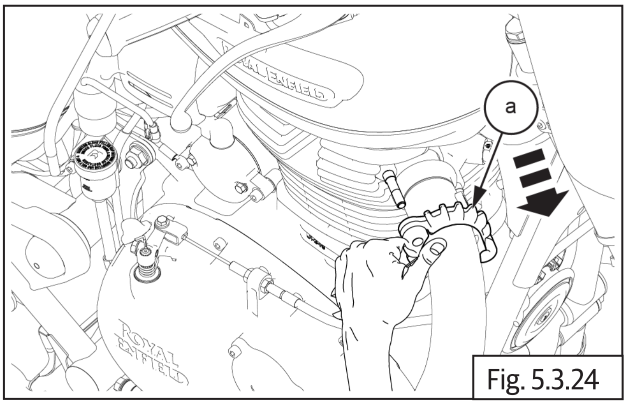


Fig. 5.3.24

- Remove the exhaust header pipe **(a)**.

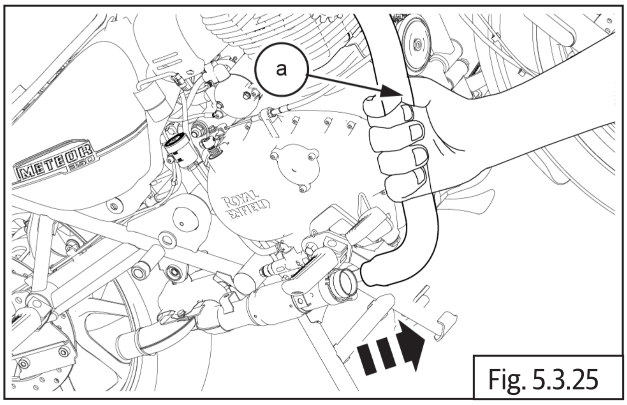


Fig. 5.3.25

⚠ CAUTION

Perform any action in exhaust pipe only after the exhaust pipe cools down.

7.4.3. O2 Sensor

- Refer headlamp dismantling section to remove O2 sensor socket.
- Loosen and remove O2 sensor **(a)** from the header pipe.

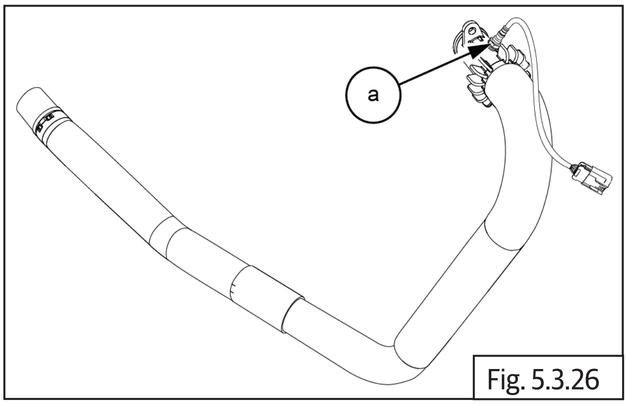


Fig. 5.3.26

	17 mm open end spanner

5.2.20. Magneto/Gear Position/Side Stand

Magneto/Gear Position/Side Stand Switch Couplers Connections

- Disconnect wiring coupler **(a)** of gear position sensor from main wiring harness **(b)**.

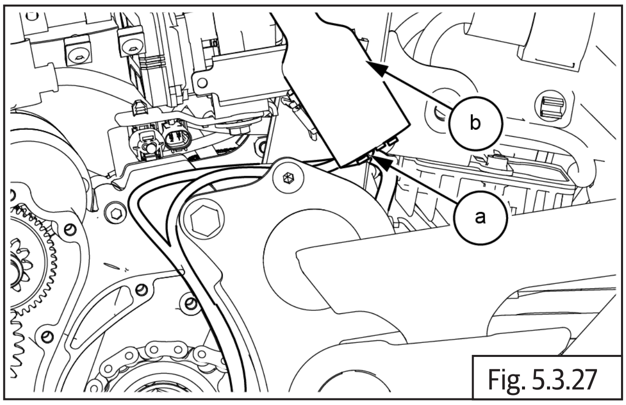


Fig. 5.3.27

- Disconnect wiring coupler **(a)** of stator from main wiring harness.

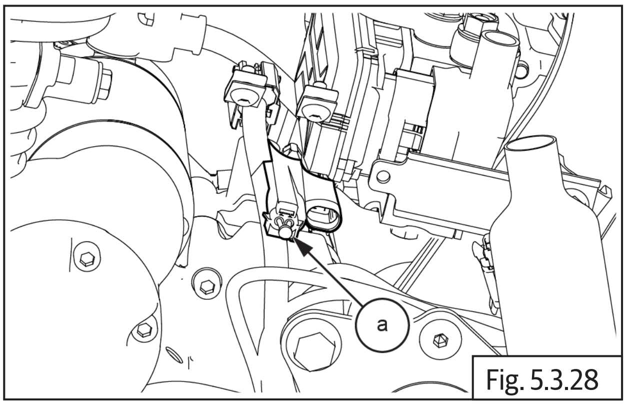


Fig. 5.3.28

- Disconnect side stand connector **(a)** from wiring harness located behind engine .

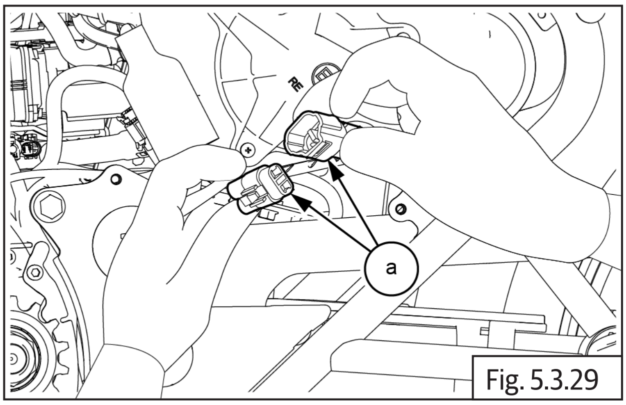


Fig. 5.3.29

5.2.21. Starter Motor Connection

- Loosen and remove Hex nut **(M6)** **(a)** from starter motor **(b)** to disconnect positive (+) terminal.

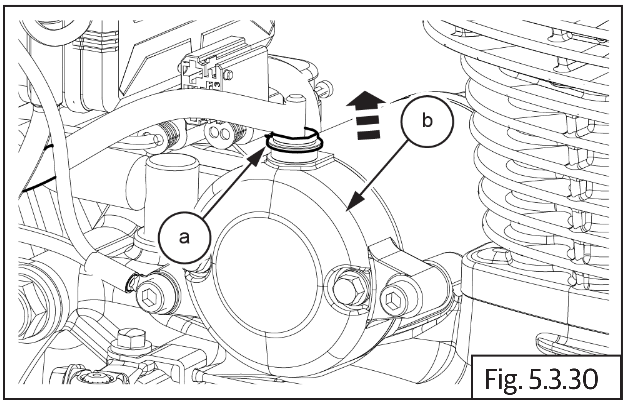


Fig. 5.3.30

🔧	10 mm Ring Spanner

- Loosen and remove 2 Nos. Hex flange head bolt **(M6)** **(a)** to disconnect starter motor **(b)** negative (-) terminal.

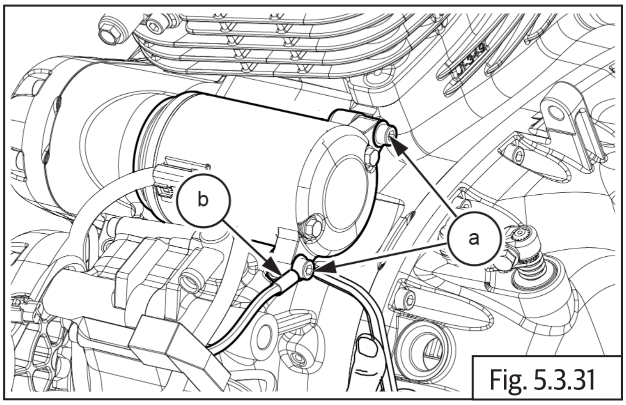


Fig. 5.3.31

🔧	10 mm Ring spanner

5.2.22. Spark Plug Suppressor Cap

- Disconnect spark plug suppressor from the spark plug **(a)**.

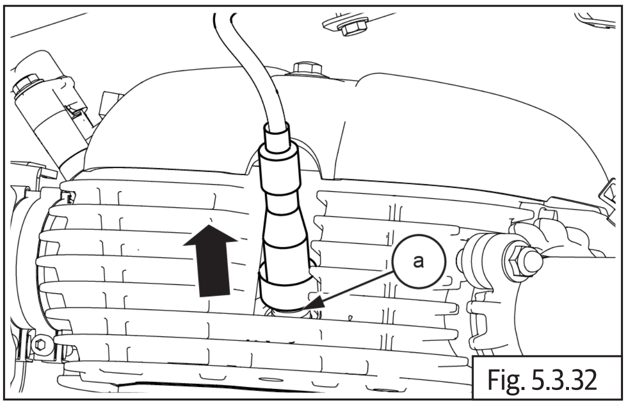


Fig. 5.3.32

5.2.23. Breather Hose Connection

- Release the clamp **(a)** to disconnect breather hose **(b)** from air filter box.

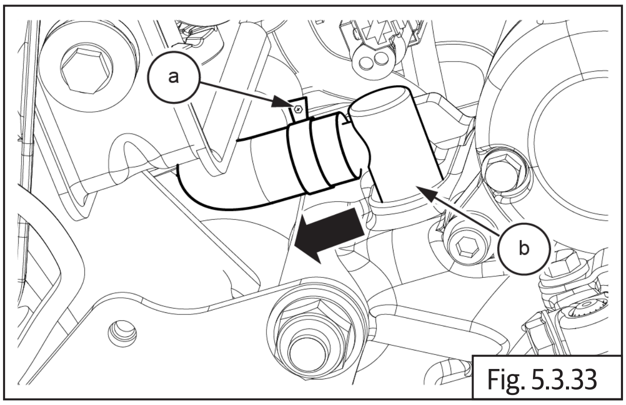


Fig. 5.3.33

🔧	Nose plier

5.2.24. Gear Shift Linkage

- Loosen Hex bolt **(M6) (a)** to remove gear pedal linkage **(b)**.

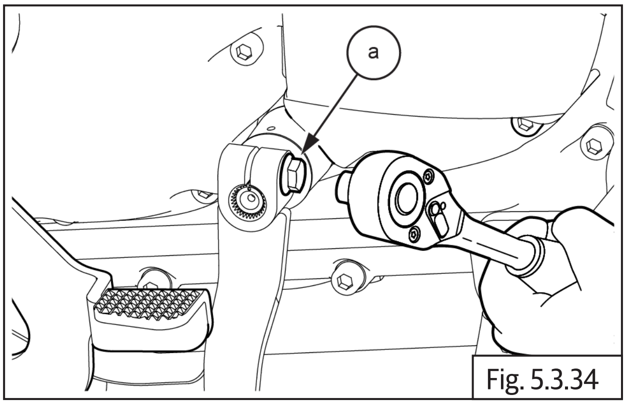


Fig. 5.3.34

🔧	10 mm Socket with Ratchet

- Loosen Hex bolt **(M10) (a)** to remove gear pedal **(b)**.

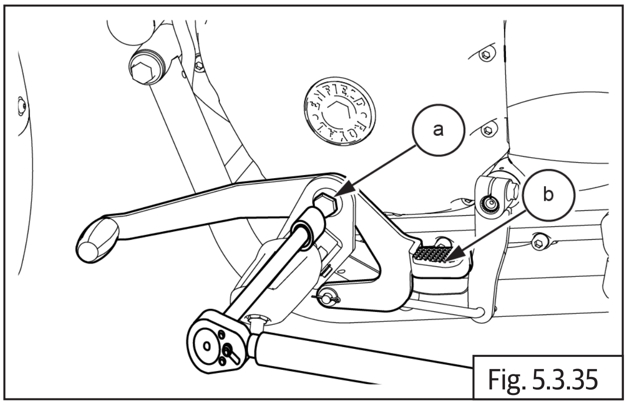


Fig. 5.3.35

🔧	14 mm Socket with Ratchet 17 mm Ring Spanner

5.2.25. FD Sprocket Cover and FD Sprocket

⚠ CAUTION
Ensure gear is in NEUTRAL position before dismantling.

- Loosen and remove 3 Nos. Hex socket head screws **(M6) (a)** from FD sprocket cover **(b)** on the LH side of engine.

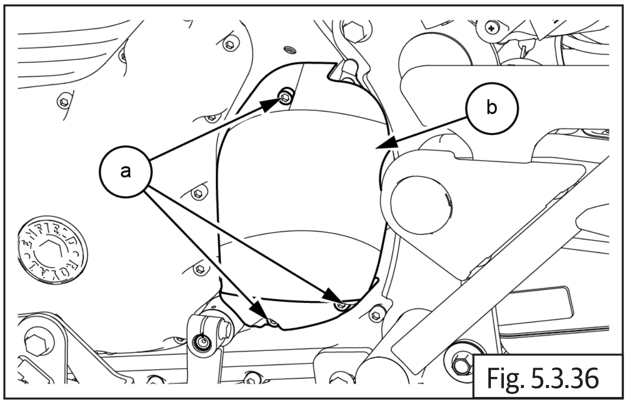


Fig. 5.3.36

🔧	5 mm Allen socket with Ratchet

- Gently pull out FD sprocket cover **(a)**.

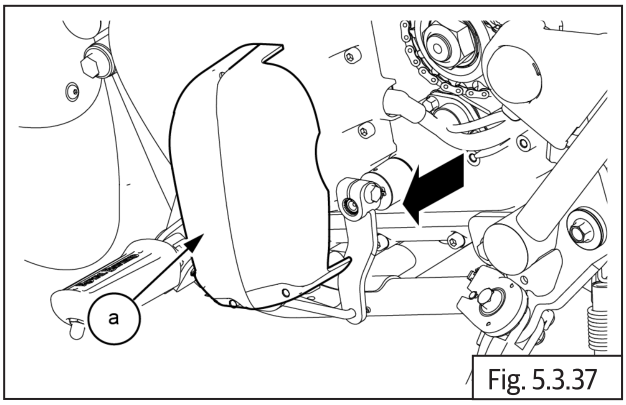


Fig. 5.3.37

- Unlock and release washer holder **(a)**.

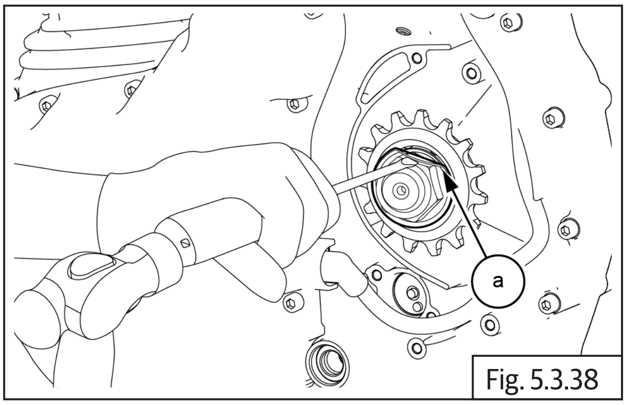


Fig. 5.3.38

🔧	Chisel and Hammer

- Apply rear brake **(a)**.

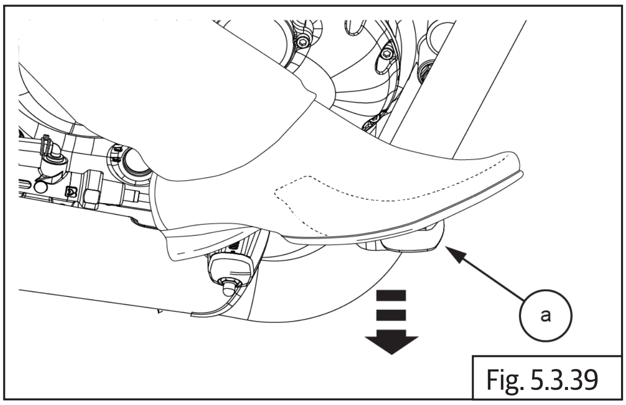


Fig. 5.3.39

- Loosen and remove FD sprocket U nut **(a)**.

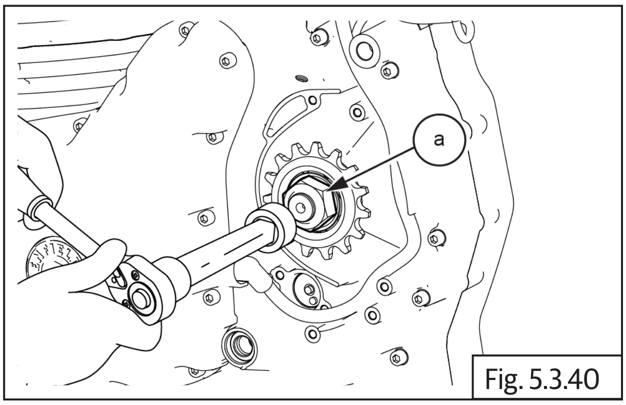


Fig. 5.3.40

🔧	30 mm socket with Ratchet

- Remove FD sprocket **(a)** from drive shaft.

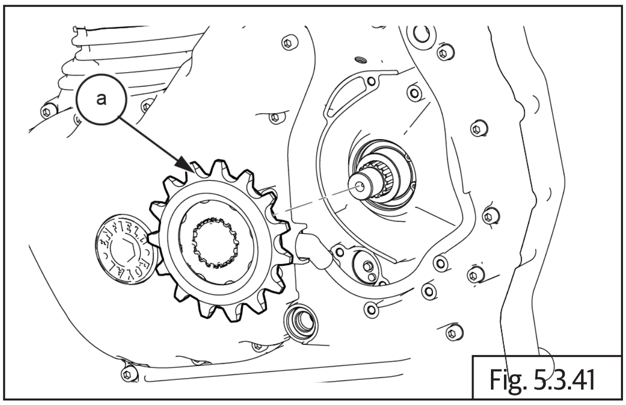


Fig. 5.3.41

5.2.26. Rear Wheel (Increasing chain slack)

- Loosen rear wheel axle nut **(M16) (a)** to increase the chain slackness/tension.

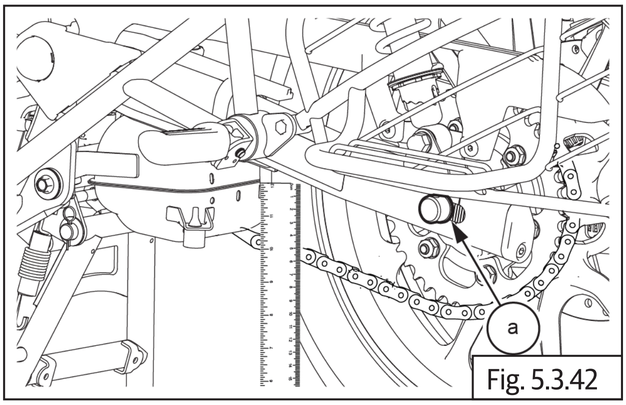


Fig. 5.3.42

🔧	24 mm Socket with Ratchet

- Loosen chain adjuster lock nut **(M8) (a)** on LH and RH.

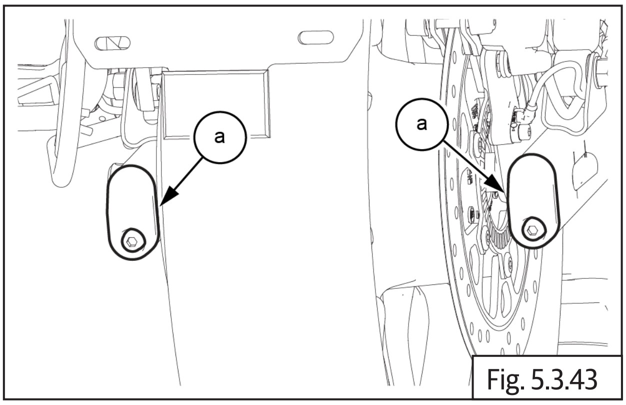


Fig. 5.3.43

🔧	6 mm Allen socket with ratchet

5.2.27. Remove Rear Chain from FD Sprocket

- Gently remove chain **(a)** from FD sprocket **(b)**.

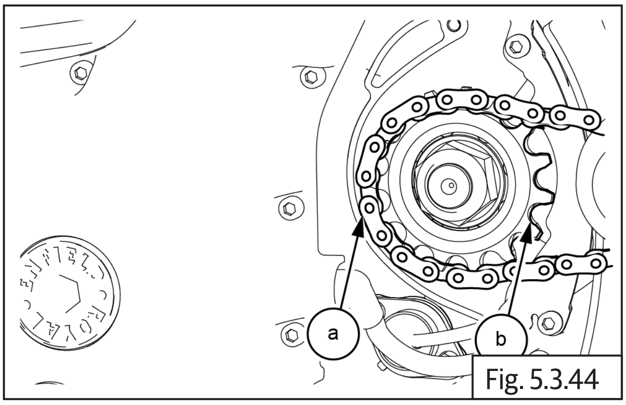


Fig. 5.3.44

5.2.28. Gear Position Sensor

- Loosen and remove 2 Nos. Hex head bolts **(M6) (a)** holding the gear position sensor to crankcase LH.
- Gently tap Gear Position Sensor and remove along with O-ring.

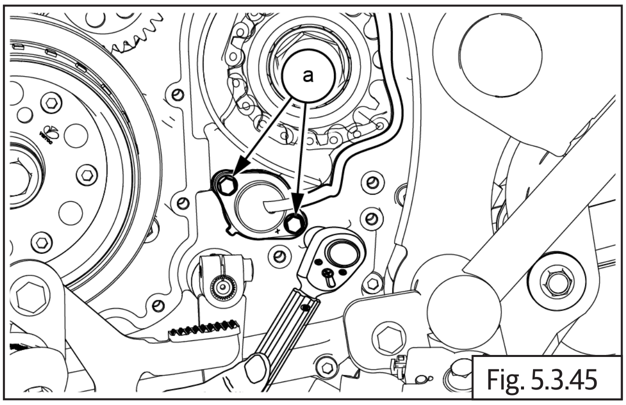


Fig. 5.3.45

🔧	10 mm Socket with Ratchet

5.2.29. Cradle Frame Mountings

Cradle Frame from Main Frame and Engine

- Loosen and remove 1 Nos. Hex socket head long bolts **(M10) (a)** on LH on cradle frame **(b)**.

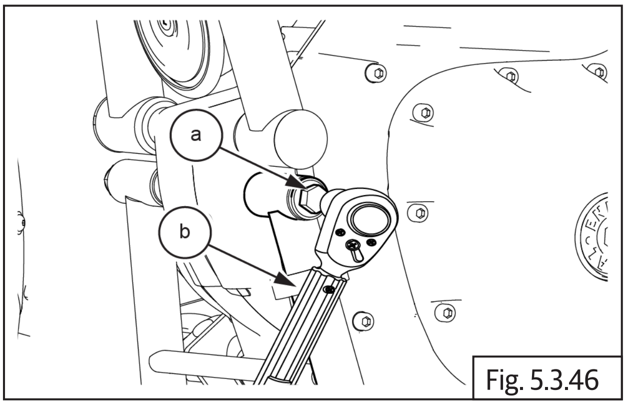


Fig. 5.3.46

🔧	14 mm socket with Ratchet

- Loosen and remove 1 Nos. Hex socket head bolts **(M8) (a)** on LH on cradle frame behind the engine **(b)**.

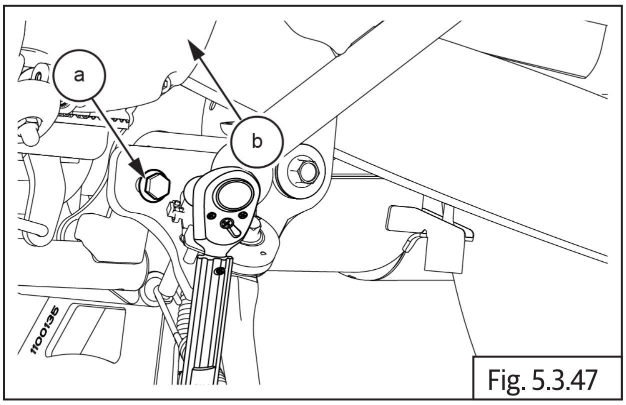


Fig. 5.3.47

🔧	12 mm socket with Ratchet

- Loosen and remove 1 Nos. Hex socket head bolt **(M10) (a)** along with nut **(b)** on RH on cradle frame **(c)**.

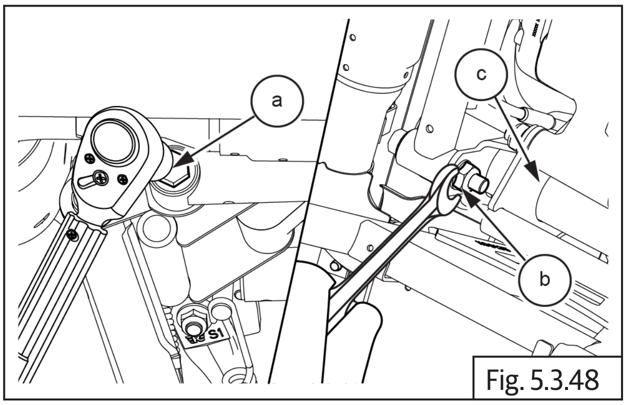


Fig. 5.3.48

14 mm socket with Ratchet

- Remove cradle frame **(a)** from engine.

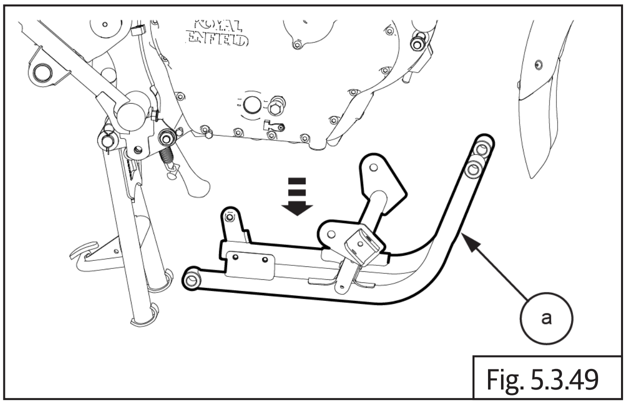


Fig. 5.3.49

5.2.30. Engine from Main Frame

- Support engine with flat jack **(a)** so that it will not fall off when mounting bolts are removed.

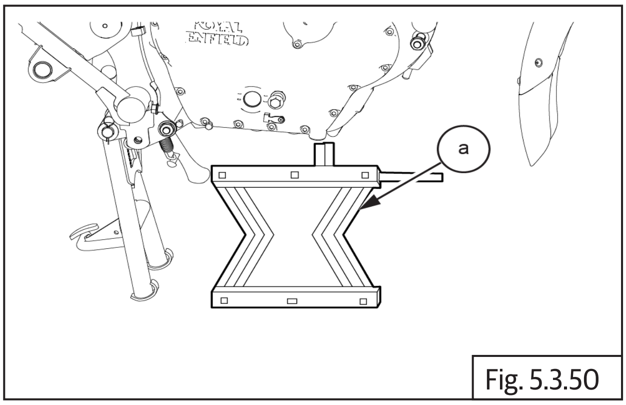


Fig. 5.3.50

- Remove Hex head bolt **(M10) (a)** along with nut **(c)** and washers **(b)** from engine front top mounting to frame .

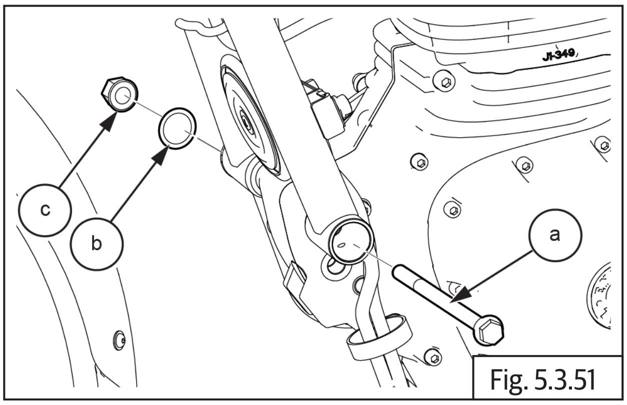


Fig. 5.3.51

14 mm Socket with Ratchet

- Loosen and remove Hex flange head bolt **(M10) (a)** along with nut **(M10) (b)** and washers **(c)** from rear lower bottom of engine.

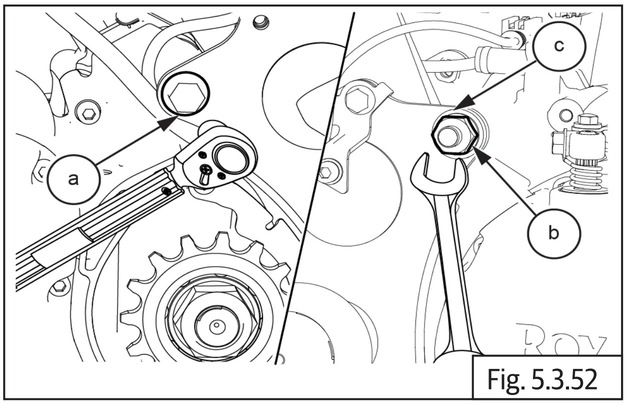


Fig. 5.3.52

14 mm Socket with Ratchet

- Loosen and remove Hex flange head bolt **(M10) (a)** along with nut **(M10) (b)** and washers **(c)** from rear upper bottom of engine.

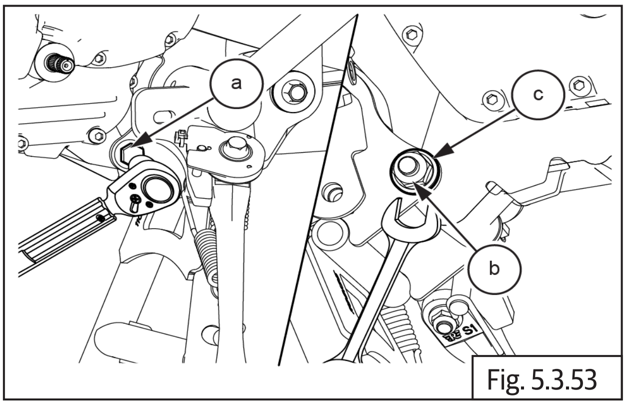


Fig. 5.3.53

🔧	14 mm Socket with Ratchet

- Gently lower the jack **(a)** and remove engine **(b)**.

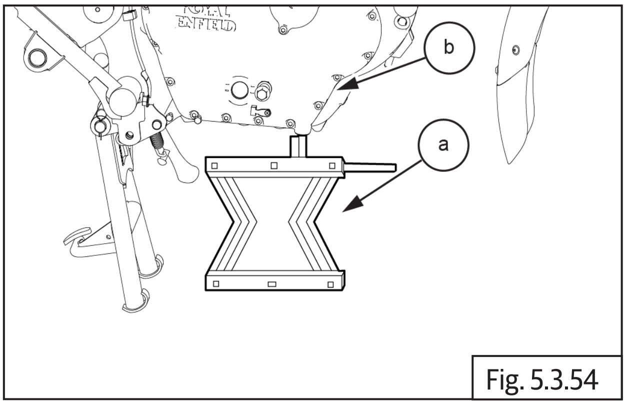


Fig. 5.3.54

ENGINE ASSEMBLY TO FRAME

Engine Assembly to Frame

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5.3 Engine Assembly to Frame

5.3.1. Engine to main frame

⚠ WARNING

DO NOT tighten bolts during initial installation.

- Support engine suitably and firmly on a flat jack and ensure it is stable.
- Locate jack **(a)** along with engine **(b)** below the frame.

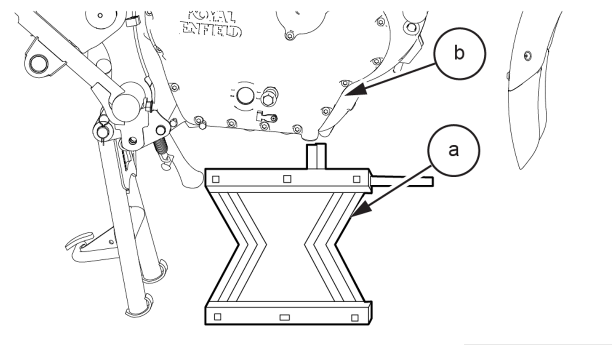

Fig. 5.4.3

- Lift the jack slowly and align mounting holes of frame with mounting holes on engine.

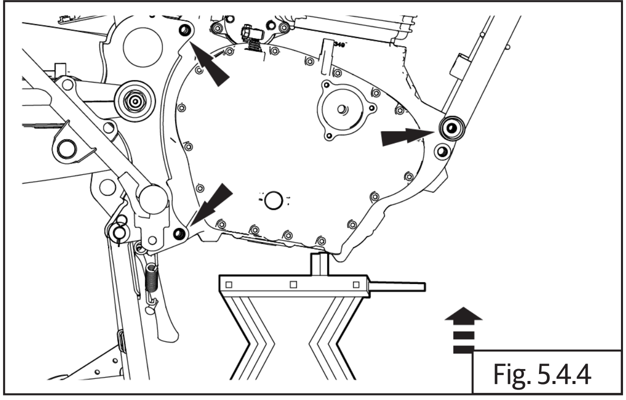

Fig. 5.4.4

- Insert Hex flange bolt long **(M10) (a)** into mounting holes on the main frame rear top, insert washer **(b)** and nut **(c)** on other side.

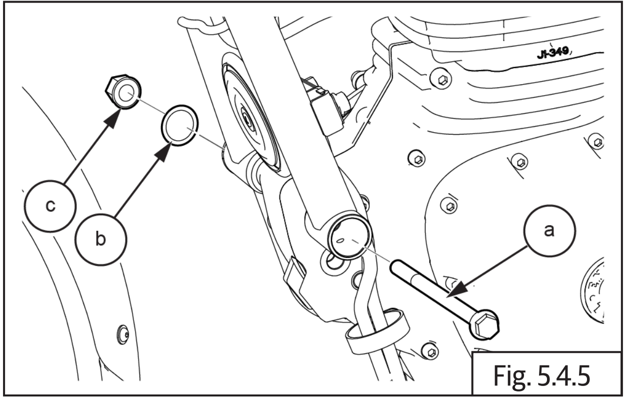

Fig. 5.4.5

- Insert Hex head bolt **(M10) (a)** into mounting holes on rear frame bottom.
- Assemble washer **(b)** and nut **(c)** on bolt. **DO NOT TIGHTEN FULLY**.

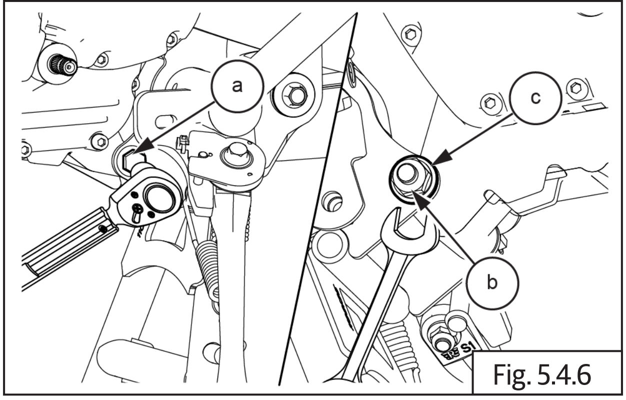

Fig. 5.4.6

🔧	14 mm Ring spanner and 14 mm Hex socket with Ratchet

- Insert Hex head bolt **(M10) (a)** into mounting holes on rear frame **(b)** top.
- Assemble washer and nut **(c)** on bolt. **DO NOT TIGHTEN FULLY**.

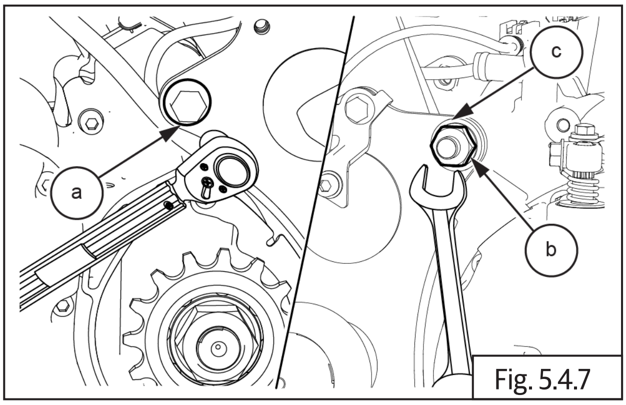

Fig. 5.4.7

	14 mm Ring spanner and 14 mm Hex socket with Ratchet

5.3.2. Engine Mounting Final Torque

- Hold Hex nut **(M10)** and tighten the bolt to specified torque.

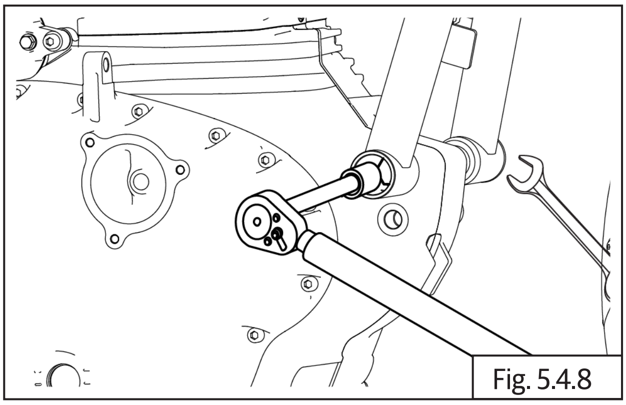

Fig. 5.4.8

	14 mm Ring spanner and 14 mm Hex socket with Torque wrench
Torque	45-55 N-m/4.5-5.5 kgf-m

- Tighten Hex head bolt **(M10) (a)** into mounting holes on frame rear bottom to torque.

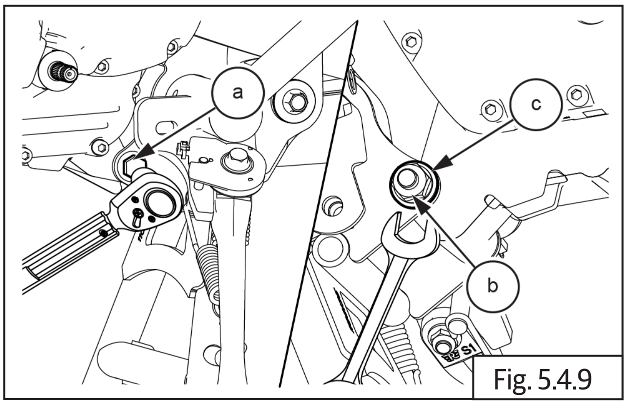

Fig. 5.4.9

	14 mm Ring spanner and 14 mm Hex socket with Torque wrench
Torque	45-55 N-m/4.5-5.5 kgf-m

- Tighten Hex socket bolts **(M10) (a)** with nut **(b)** on top rear frame **(c)** to engine.

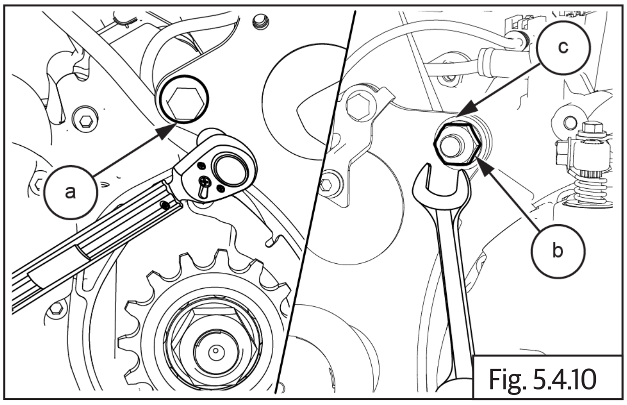

Fig. 5.4.10

	14 mm Ring spanner and 14 mm Hex socket with Torque wrench
Torque	45-55 N-m/4.5-5.5 kgf-m

5.3.3. Cradle Frame Mountings

- Align cradle frame **(a)** to engine **(b)** and main frame.

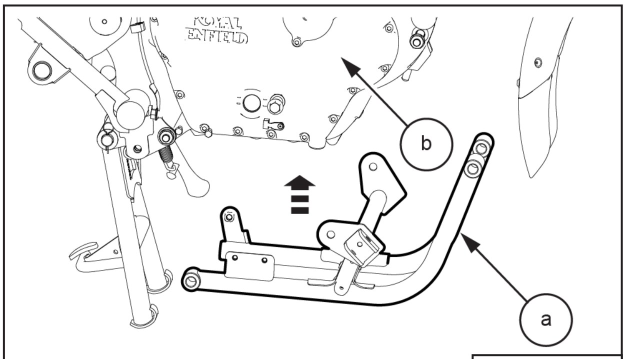

Fig. 5.4.11

- Locate 1 No long bolt along with nut **(a)** on cradle frame bottom to engine. **DO NOT TIGHTEN FULLY**.

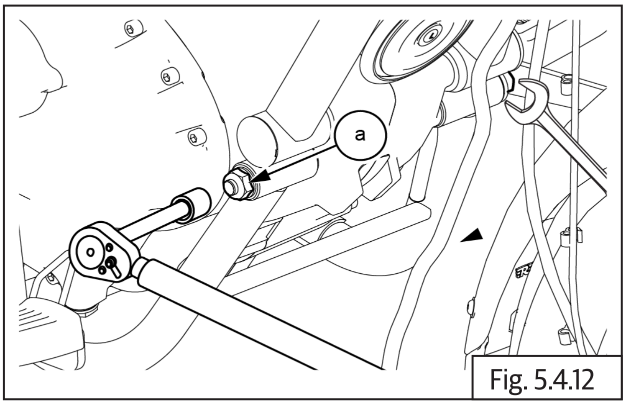

Fig. 5.4.12

🔧	14 mm Ring spanner and 14 mm Hex socket with Torque wrench
Torque	45-55 N-m/4.5-5.5 kgf-m

- Locate 1 No hex head bolt **(a)** on cradle frame RH bottom to frame **(b)**. **DO NOT TIGHTEN FULLY**.

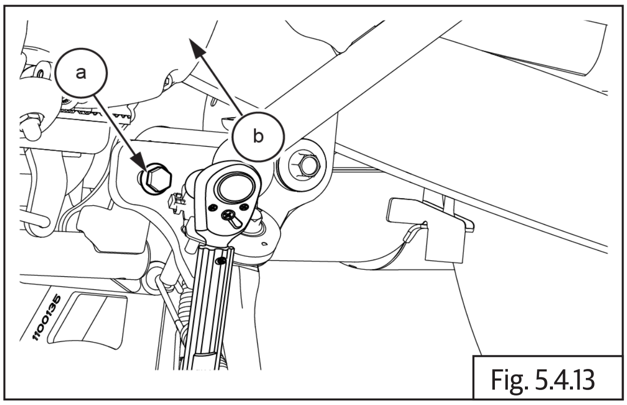

Fig. 5.4.13

🔧	12 mm Hex socket with Torque wrench
Torque	22-28 N-m/2.2-2.8 kgf-m

- Locate 1 No hex head bolt **(a)** along with nut on cradle frame LH bottom to frame. **DO NOT TIGHTEN FULLY**.

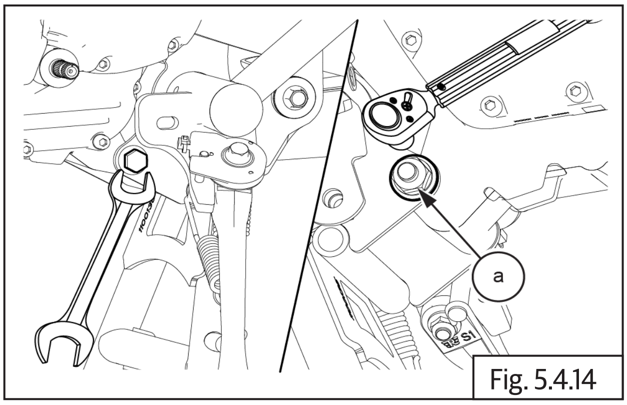

Fig. 5.4.14

🔧	14 mm Ring spanner and 14 mm Hex socket with Torque wrench
Torque	45-55 N-m/4.5-5.5 kgf-m

5.3.4. Gear Position Indicator Sensor

- Connect gear position sensor **(a)** to connector located behind engine.

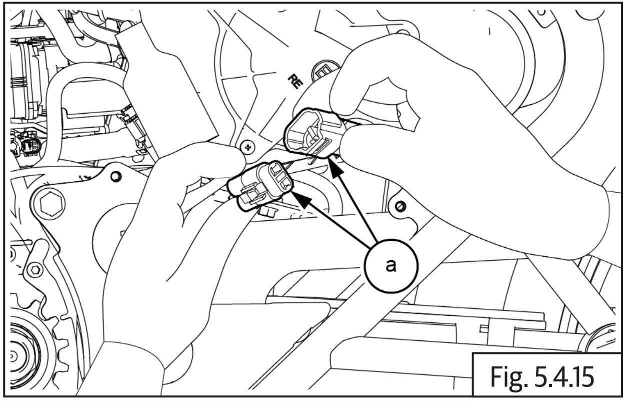

Fig. 5.4.15

5.3.5. FD Sprocket

⚠ CAUTION

Ensure gear is in NEUTRAL position before assembling.

- Locate FD sprocket **(a)** to drive shaft.

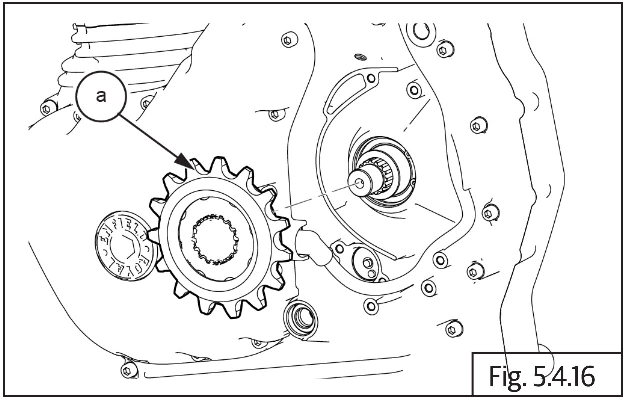

Fig. 5.4.16

- Loosen rear wheel mountings and chain adjusters and push rear wheel into swing arm to increase chain slack.
- Position rear chain over FD sprocket teeth properly.
- Assemble chain **(a)** on FD sprocket **(b)**.

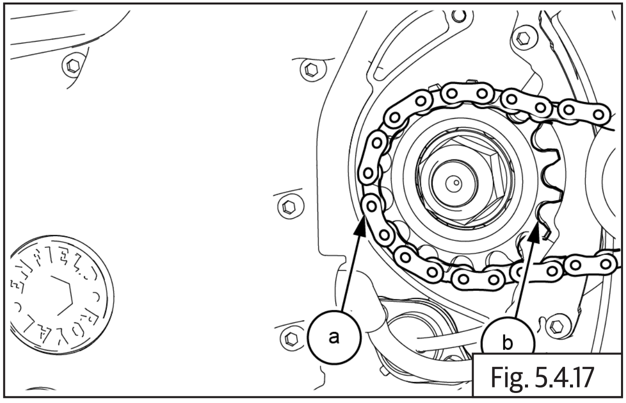

Fig. 5.4.17

- Apply rear brake **(a)**.

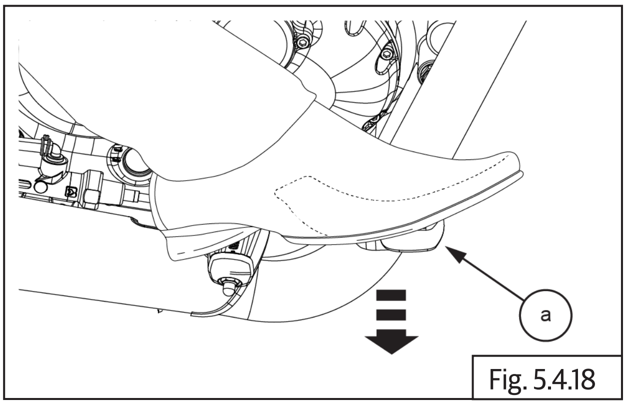

Fig. 5.4.18

- Locate FD sprocket U nut **(a)** along with tab washer and tighten it.

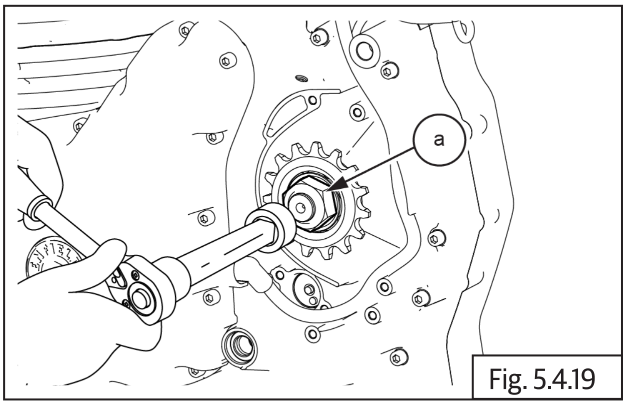

Fig. 5.4.19

🔧	30 mm socket and Torque wrench
Torque	130-160 N-m/13.0-16.0 kgf-m

- Adjust rear chain tension to specification: 30 mm to 40 mm (section 6.8.9).

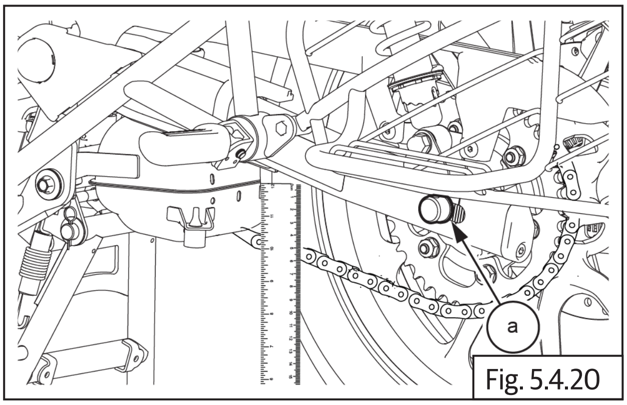

Fig. 5.4.20

- Tighten rear wheel axle nut **(a)** (section 6.8.8).

5.3.6. FD Sprocket Cover

- Assemble FD sprocket cover **(a)** on crankcase LH.
- Locate 3 Nos. Hex socket head bolts **(M6) (b)** on FD sprocket cover and tighten in a crisscross pattern to specified torque.

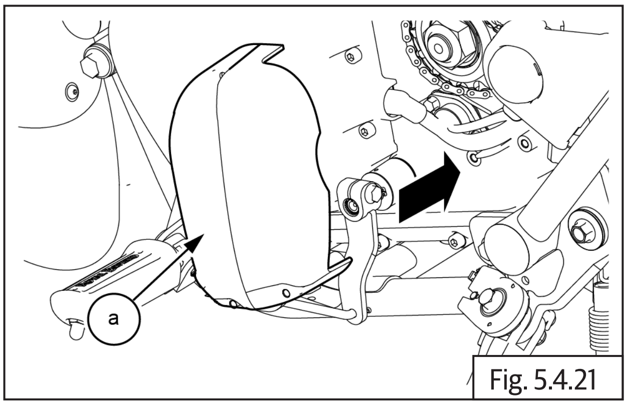

Fig. 5.4.21

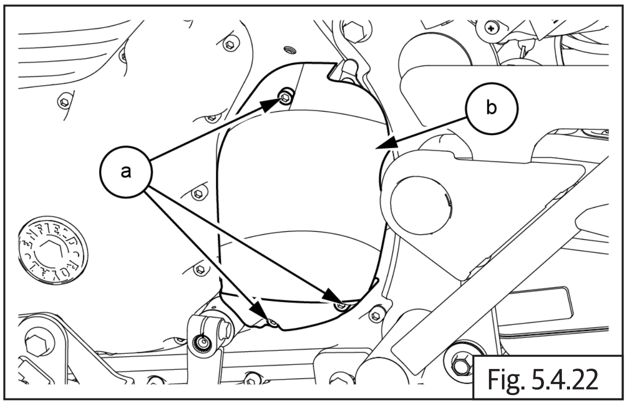

Fig. 5.4.22

	5 mm Allen socket and Torque wrench
Torque	8-12 N-m/0.8-1.2 kgf-m

5.3.7. Gear Shift Linkage

- Align dot mark in shaft serration with the slot in gear pedal linkage
- Locate Hex bolt **(M6) (a)** to remove gear pedal linkage **(b)**.

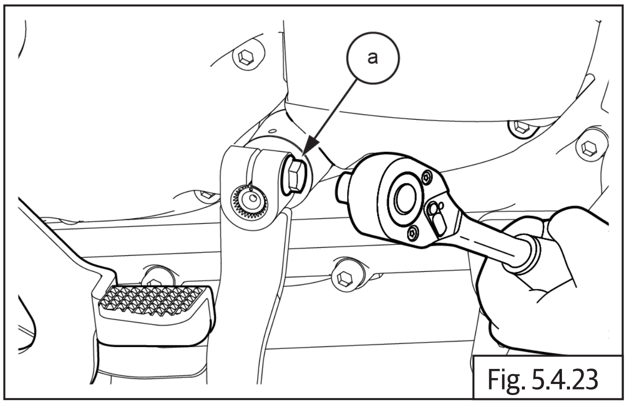

Fig. 5.4.23

	10 mm Socket with Ratchet

- Locate Hex bolt **(M10) (b)** on gear lever and tighten to specified torque.

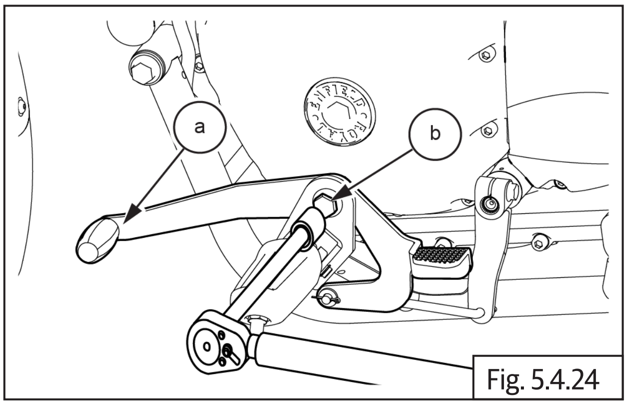

Fig. 5.4.24

	14 mm socket with Torque wrench and 17 mm Ring SPanner
Torque	10 N-m/1 kgf-m

5.3.8. Breather Hose Connection

- Insert breather hose **(b)** on the tube into crankcase plug **(c)**. Position the clip **(a)** on hose correctly.

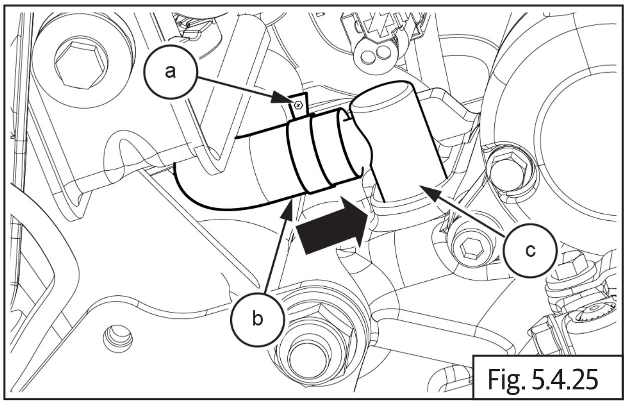

Fig. 5.4.25

	Nose plier

5.3.9. Spark Plug Suppressor Caps

- Gently insert spark plug suppressor **(a)** into spark plug **(b)**.

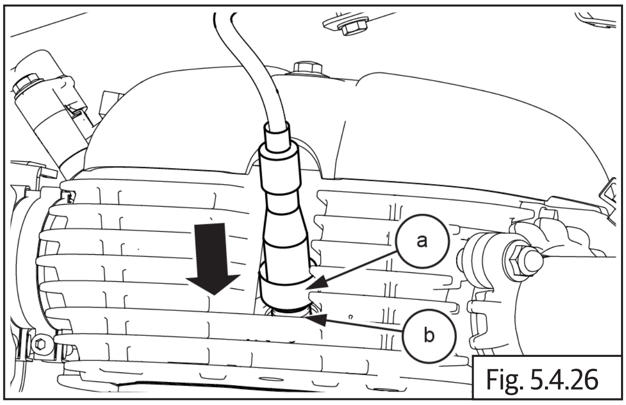

Fig. 5.4.26

5.3.10. Starter Motor Connections

- Connect starter motor negative (-) cable **(a)** to terminal.
- Assemble 2 Nos. Hex flange head bolts **(M6) (b)** into starter motor tighten firmly.

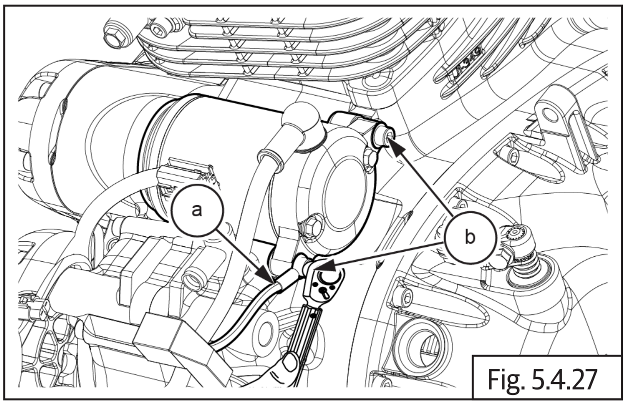

Fig. 5.4.27

🔧	10 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Connect positive (+) cable **(a)** to starter motor terminal. Assemble Hex nut **(M6) (b)** and tighten firmly, duly ensuring the cable/terminal does not rotate.
- Slide protective cap over terminal on starter motor.

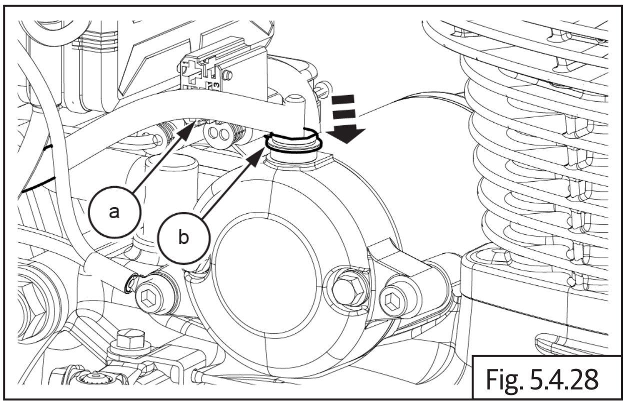

Fig. 5.4.28

🔧	10 mm Double end spanner

5.3.11. Magneto/Side Stand Switch Connectors

- Connect magneto sensor connector located on rear of the engine.

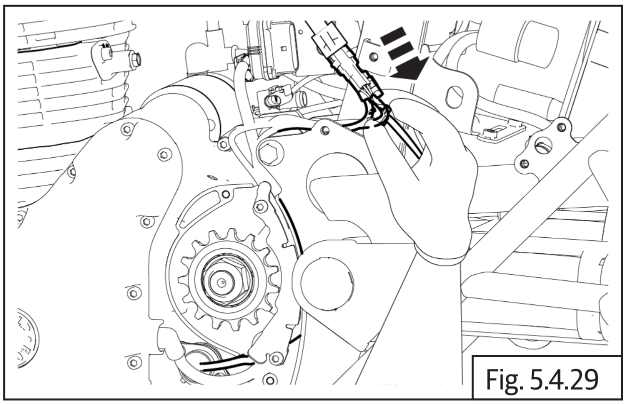

Fig. 5.4.29

- Connect side stand switch connector **(a)** located on rear top of engine.

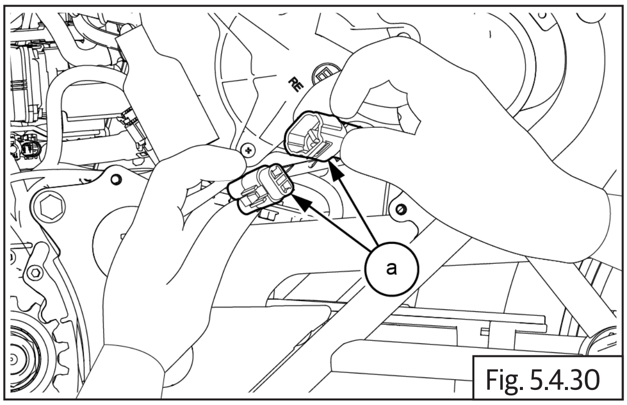

Fig. 5.4.30

5.3.12. Exhaust Pipe on Cylinder Head

- Locate exhaust pipe **(a)** into exhaust manifold on the cylinder head and ensure the exhaust pipe flange is properly located on the studs.

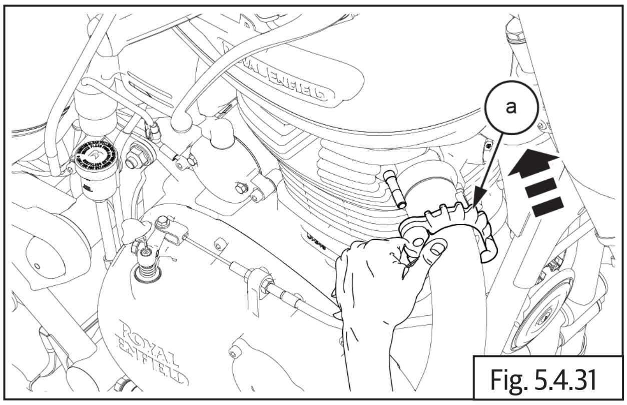

Fig. 5.4.31

- Assemble 2 nos hex nuts on the studs and hand tight it to align the rear end mounting.

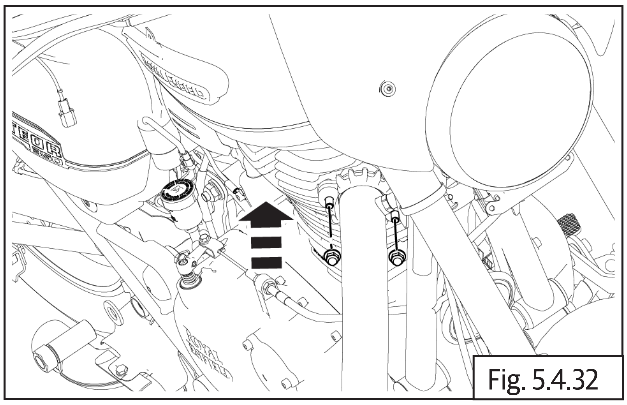

Fig. 5.4.32

🔧	14 mm socket with ratchet

8.4.1. Catalytic converter

- Locate the catalytic converter (a) in the bottom of the frame.

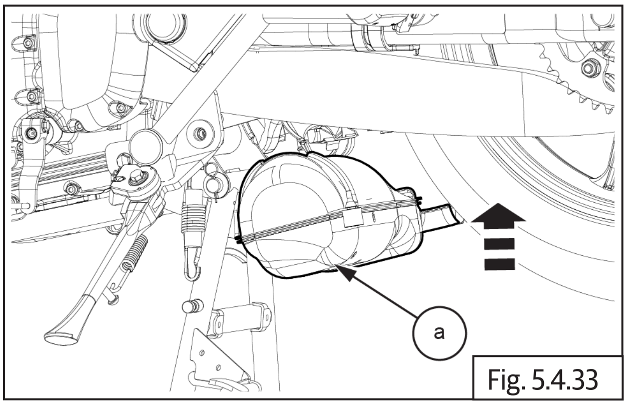

Fig. 5.4.33

- Locate mounting bolt **(a)** along with washers **(b)** and grommets **(c)** the **(M8)** bolt on the LH frame.

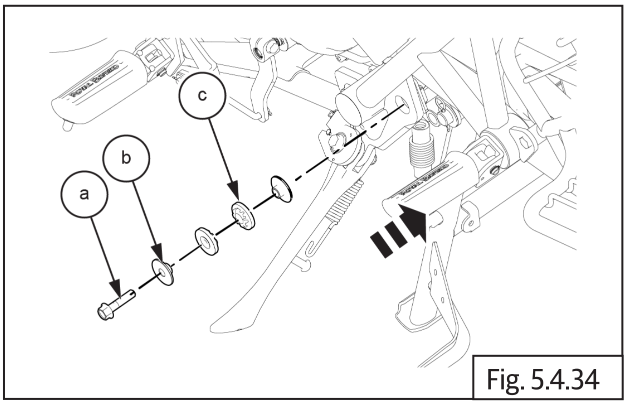

Fig. 5.4.34

🔧	12 mm socket with ratchet
Torque	25-35N-m/2.5-3.5 kgf-m

- Locate mounting bolt **(a)** along with washers **(b)** and grommets **(c)** the **(M8)** bolt on the RH frame.

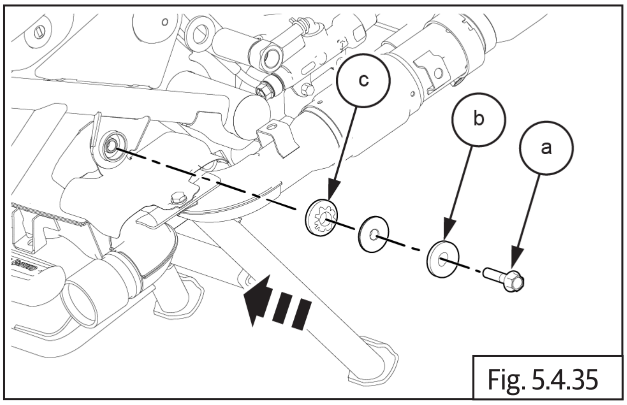

Fig. 5.4.35

🔧	12 mm socket with ratchet
Torque	25-35 N-m/2.5-3.5 kgf-m

- Insert the outer end of the exhaust header pipe **(a)** into the intake of the catalytic converter.

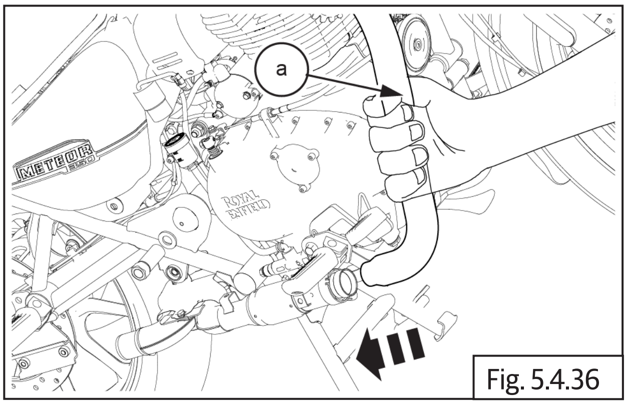

Fig. 5.4.36

- Tighten the clamp bolt **(a)** at exhaust header pipe outer end.

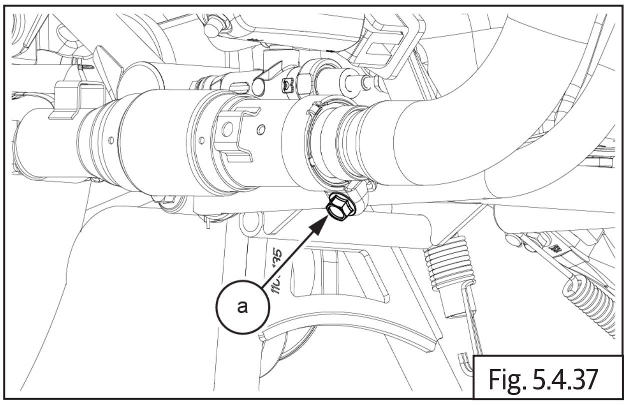

Fig. 5.4.37

🔧	12mm socket with ratchet
Torque	28-35 N-m/2.8-3.5 kgf-m

- Tighten the exhaust header pipe mounting bolts **(a)** at the cylinder head end.

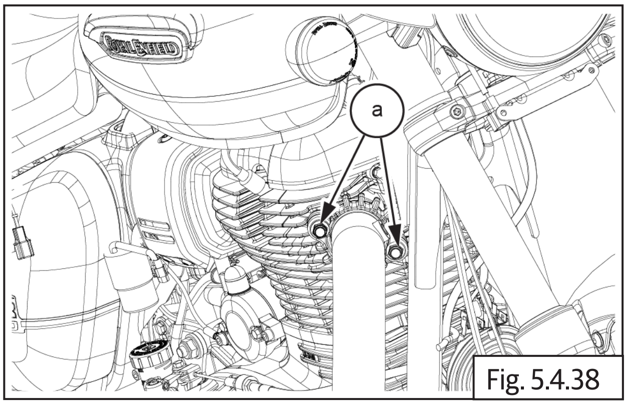

Fig. 5.4.38

🔧	14 mm socket with torque wrench
Torque	21-29 N-m/2.1-2.9 kgf-m

8.4.2. Silencer

- Insert the silencer in the catalytic converter outer pipe.

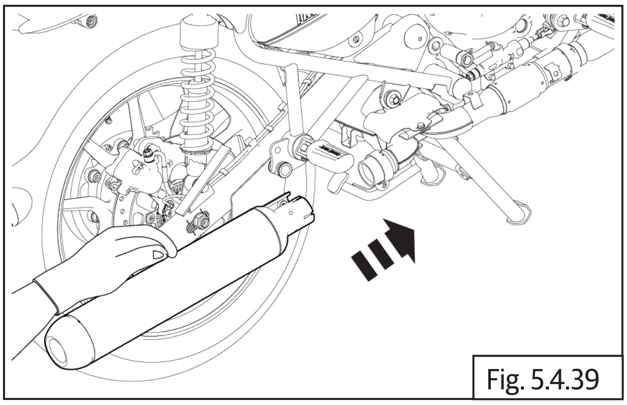

Fig. 5.4.39

- Locate the mounting hole in the frame and insert **(M8)** bolt **(a)** and tighten it.

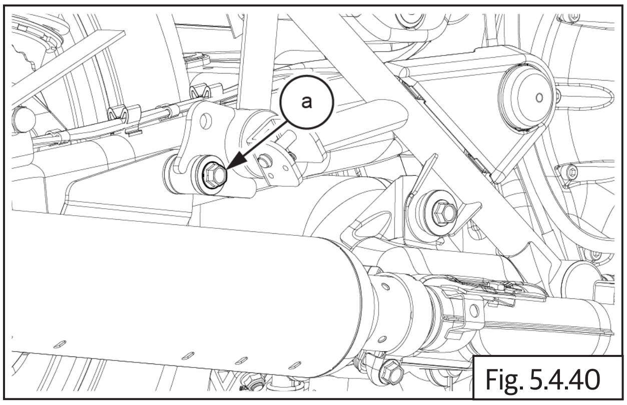

Fig. 5.4.40

🔧	12 mm socket with ratchet
Torque	21-29 N-m/2.1-29 kgf-m

- Tighten the mounting clamp **(a)** at the catalytic converter end.

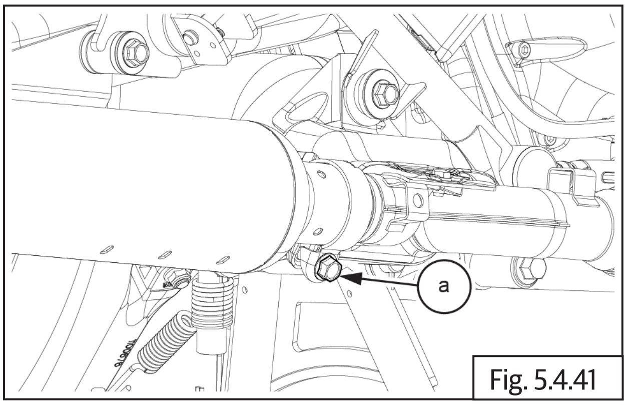

Fig. 5.4.41

🔧	12 mm socket with ratchet
Torque	20-25 N-m/2.0-2.5 kgf-m

- Locate the silencer guard back plate **(a)** and fix it in the silencer with 3 Nos **(M6) (b)** hex socket bolts..

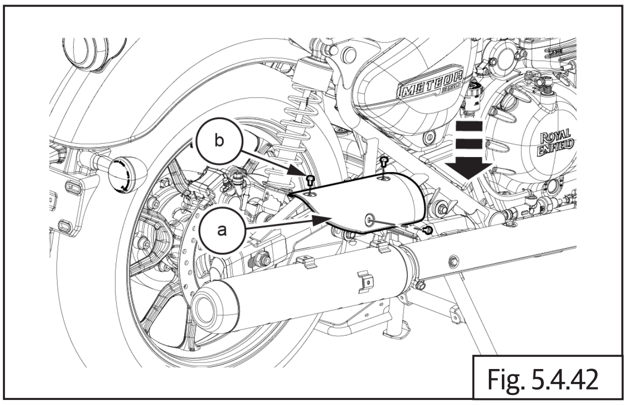

Fig. 5.4.42

🔧	10 mm socket with ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

5.3.13. Hego/Oxygen Sensor Connectors

- Ensure Hego/oxygen sensor are tightened fully on exhaust pipe.
- Connect Hego/Oxygen sensor connector **(a)** in frame **(b)**.
- Ensure connectors are locked properly. (There is a “Click” sound when locked).

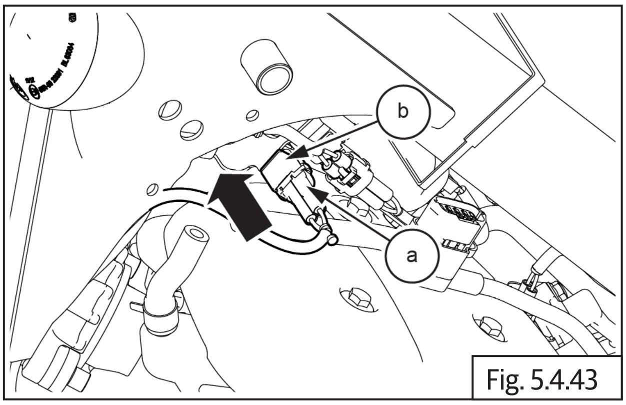

Fig. 5.4.43

5.3.14. Throttle Body

- Insert throttle body **(a)** into intake manifold flange **(b)**

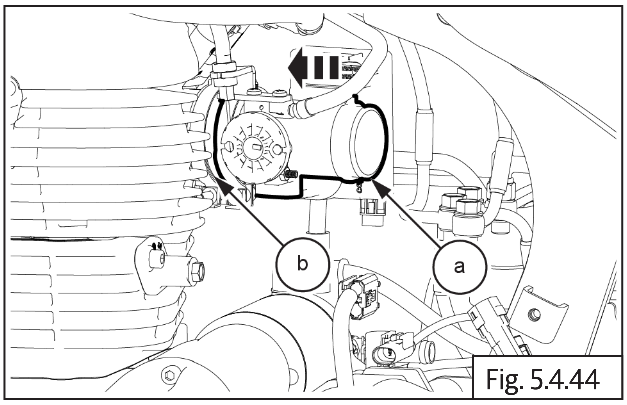

Fig. 5.4.44

- Tighten lock clip **(a)**.

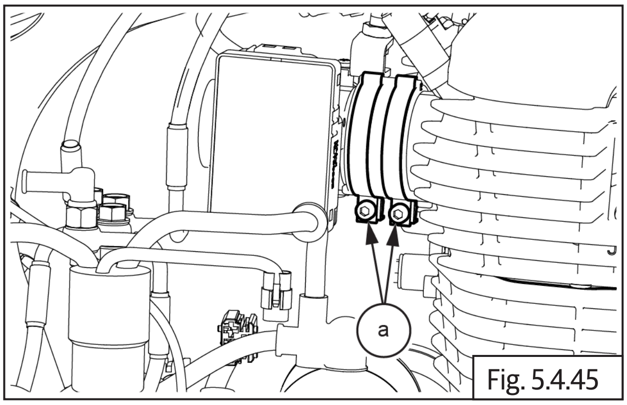

Fig. 5.4.45

🔧	4 mm Allen socket With Ratchet

- Connect wiring harness coupler **(a)** to ECU **(b)**..

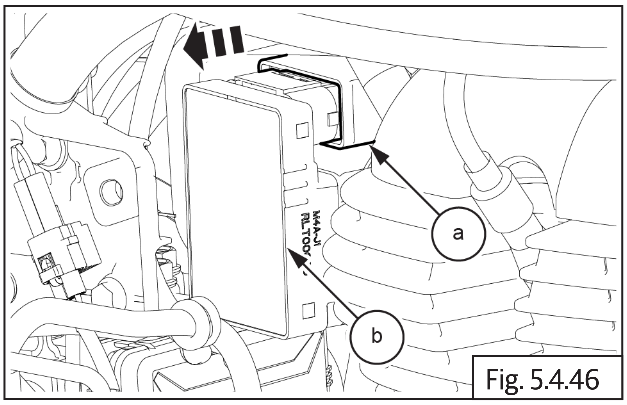

Fig. 5.4.46

5.3.15. Air Filter Housing to Throttle Body

- Insert throttle body rear end in the air box opening.

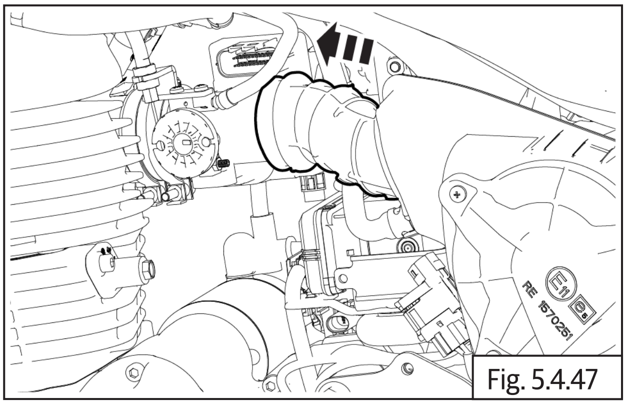
Fig. 5.4.47

- Tighten the lock clip **(a)**.

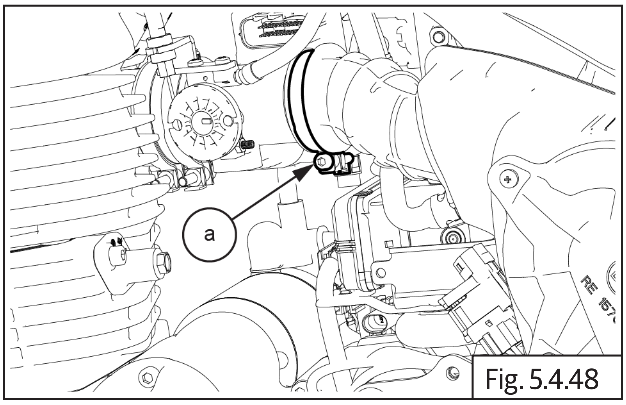

Fig. 5.4.48

5.3.16. Reed Valve Connection

- Connect the reed valve hose **(a)**.

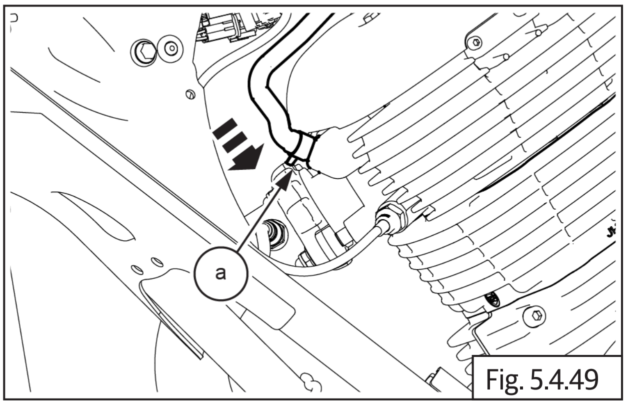

Fig. 5.4.49

5.3.17. Injector Connections

- Connect injector connector **(a)** located on inlet manifold **(b)**.

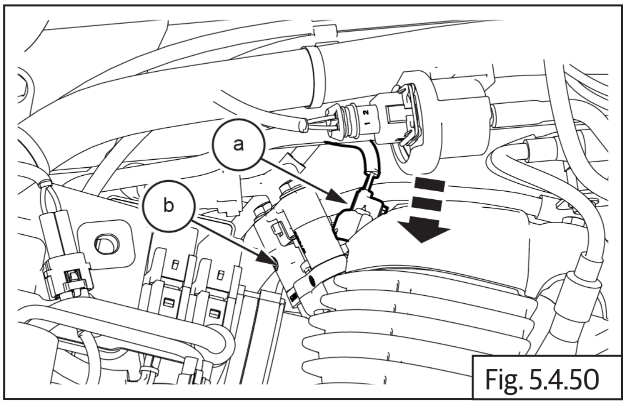

Fig. 5.4.50

- Connect idle EVAP hoses **(a)** into throttle body **(b)**.

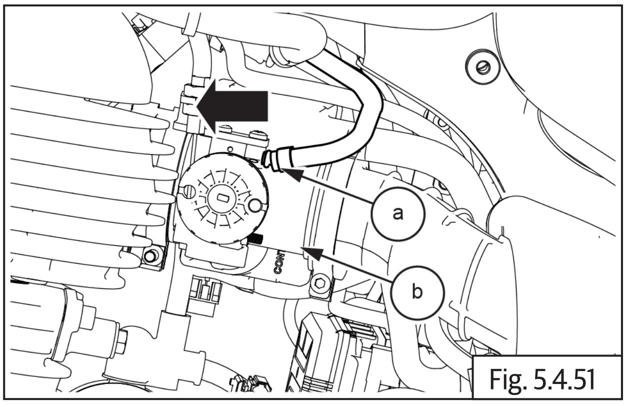

Fig. 5.4.51

5.3.18. Throttle Cable

- Insert cable **(a)** into the slot in the bracket in the throttle body and ensure the adjuster is fully into the bracket on throttle body.

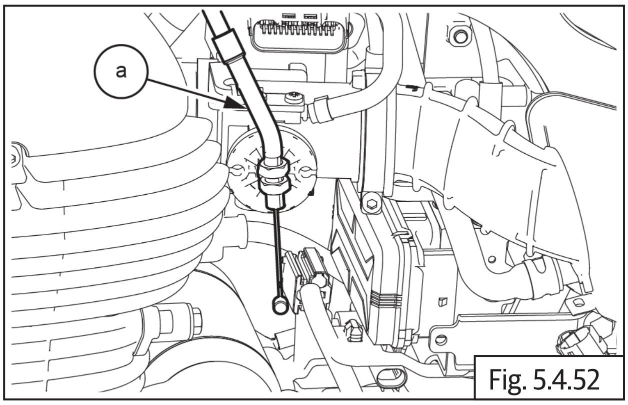

Fig. 5.4.52

- Assemble lock nut **(a)** on the inner cable.
- Position inner cable to the slot of the rotor on throttle body, insert inner cable into the eyelet and route the cable in the groove in the rotor of the throttle body.

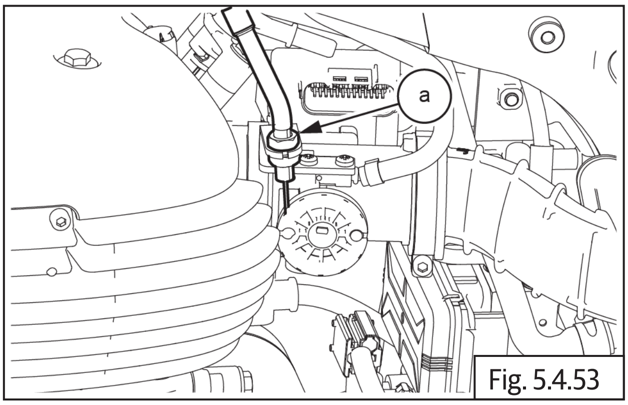

Fig. 5.4.53

- Ensure inner cables is seated properly in the eyelets at throttle body end and handlebar end. Gently rotate throttle rotor at handlebar and ensure they are operating properly.
- Tighten the checknut **(a)** sufficiently.

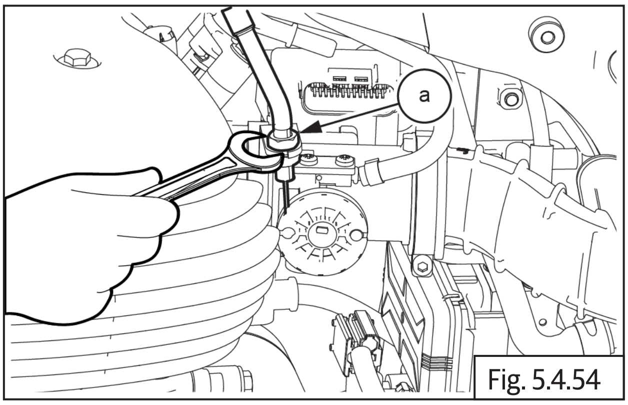

Fig. 5.4.54

🔧	12 mm Open end spanner

5.3.19. Fuel Tank

- Hold and slide fuel tank **(a)** into frame guide **(b)** and ensure bush in fuel tank are aligned into guide in frame.

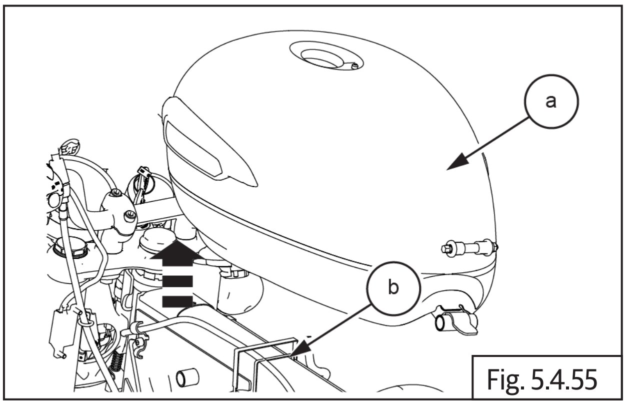

Fig. 5.4.55

5.3.20. Drain Hose

- Gently lift fuel tank and connect drain hose connection **(a)** to fuel tank **(b)**.

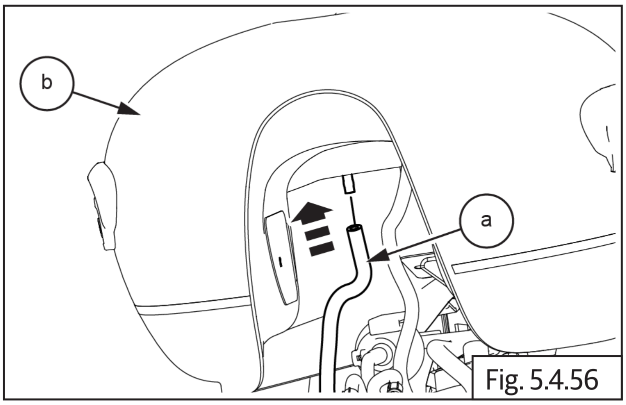

Fig. 5.4.56

5.3.21. EVAP Connections to Fuel Tank

- Connect EVAP connection hose **(a)** to fuel tank **(b)**.

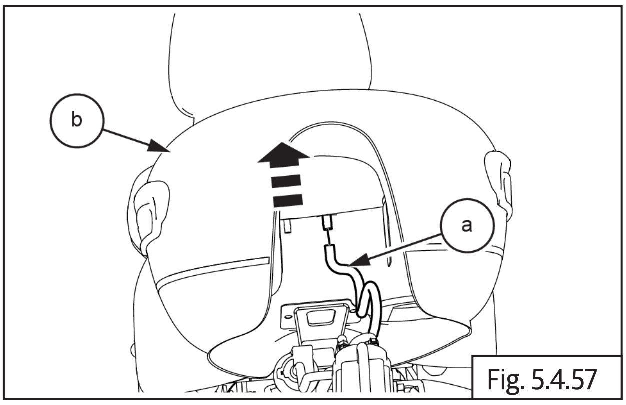

Fig. 5.4.57

5.3.22. Fuel Hose (Fuel Pump to Injector)

- Connect fuel hose **(a)** into quick fix connector **(b)** and ensure lock button is locked with a click sound.

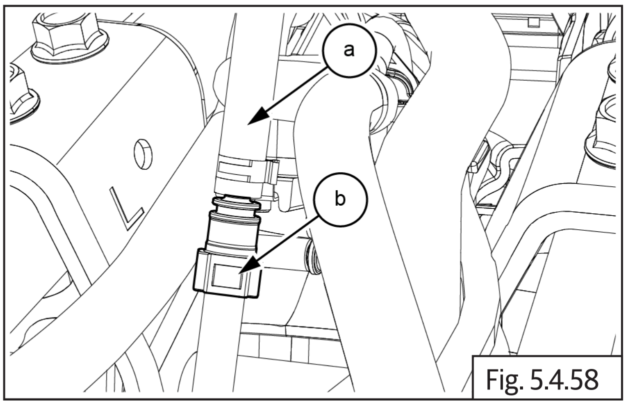

Fig. 5.4.58

5.3.23. Fuel Pump Connector

- Connect fuel pump connector **(a)** into fuel pump **(b)**.

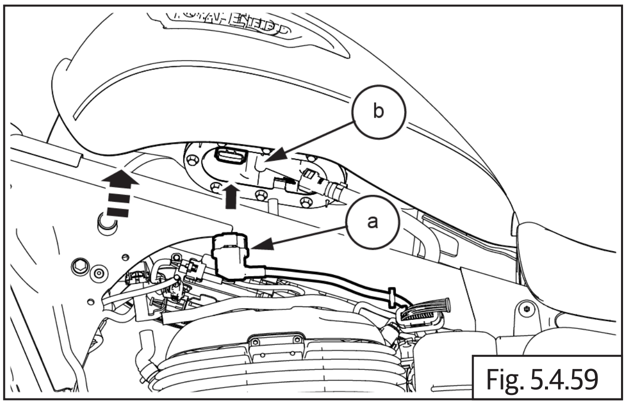

Fig. 5.4.59

- Gently lower the fuel tank into frame.
- Locate and tighten 1 No. Hex head bolts **(M5)** **(a)** on rear end of fuel tank **(b)**.

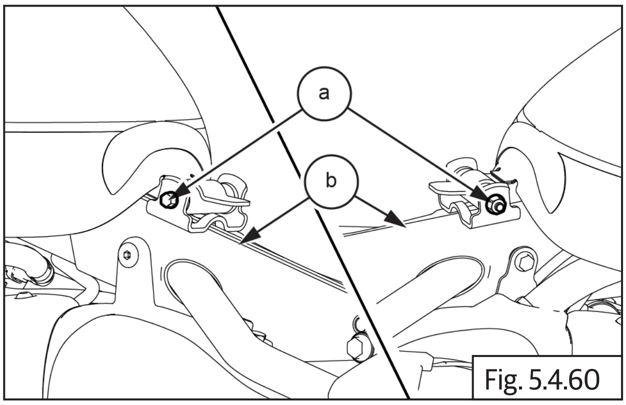

Fig. 5.4.60

	10 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Insert inner cable into the cable guide **(b)** in clutch cover assembly and ensure the adjuster **(a)** is fully inside the guide in clutch cover assembly.

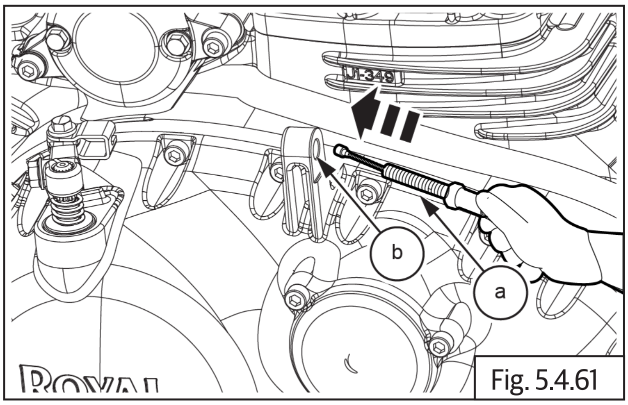

Fig. 5.4.61

- Assemble adjuster nut **(a)** on the adjuster and tighten by a few threads.

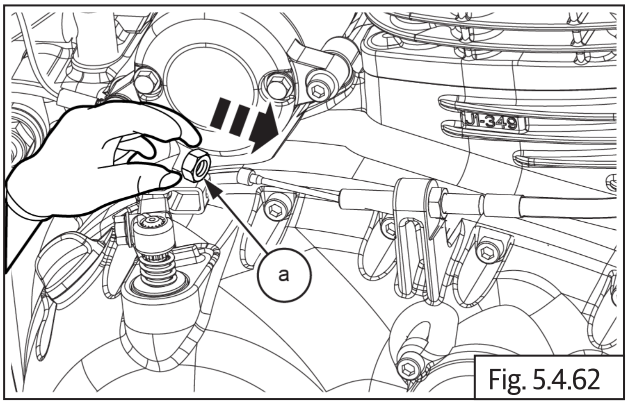

Fig. 5.4.62

- Assemble protective rubber boot **(a)** on clutch cable inner **(b)**.

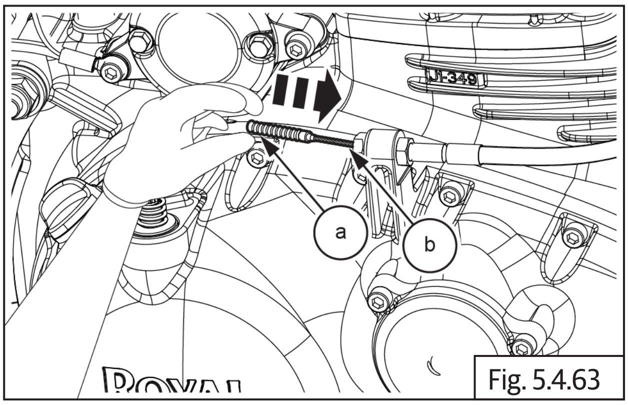

Fig. 5.4.63

- Gently locate inner cable **(a)** into clevis **(b)** in clutch actuator shaft **(c)**.

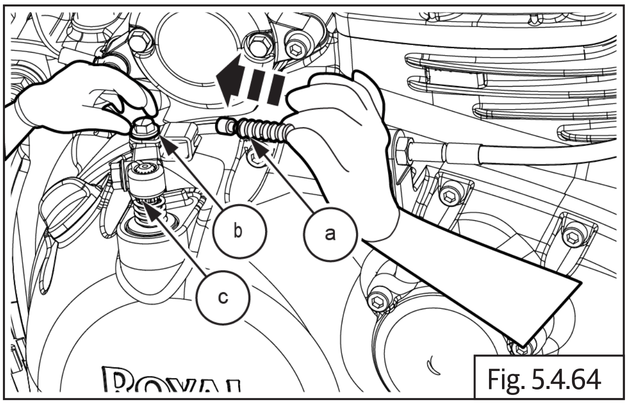

Fig. 5.4.64

Clutch Cable Free Play Adjustment

- Loosen lock nuts **(a)** completely in clutch cable **(b)**.

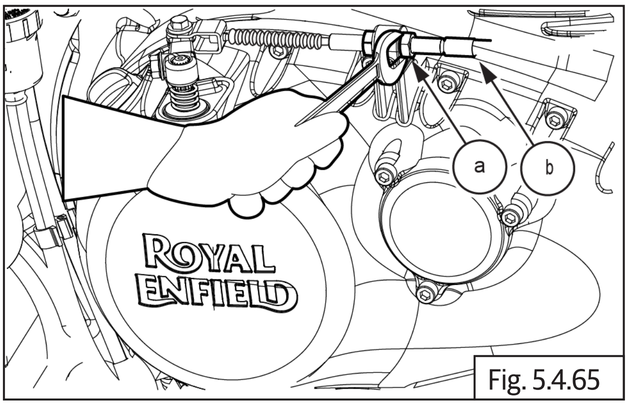

Fig. 5.4.65

🔧	12 mm Double end spanner

- Tighten the adjuster **(a)** at lever end fully.
- Now loosen the adjuster for 4 full turns.

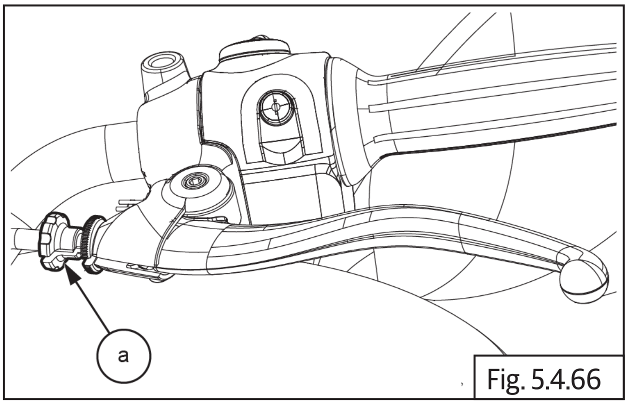

Fig. 5.4.66

- Adjust free play at engine to give zero free play. Tighten adjuster nuts **(a)** in clutch cable **(b)** at cover RH to recomended torque.

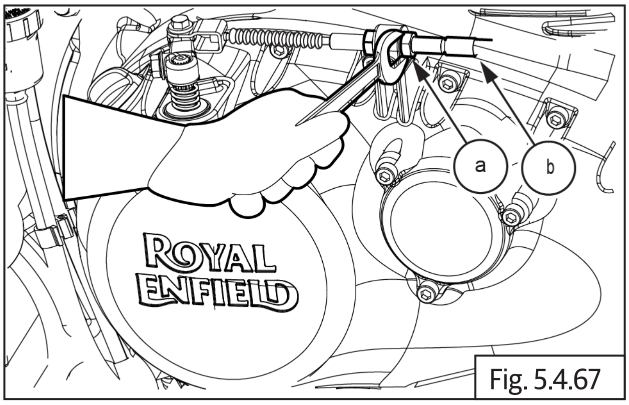

Fig. 5.4.67

🔧	12 mm open end torque wrench
Torque	4-8 N-m/0.4-0.8 kgf-m

- Set steering to full left position, pull and release lever three times. Adjust ball end to give a free play of 10-12mm.

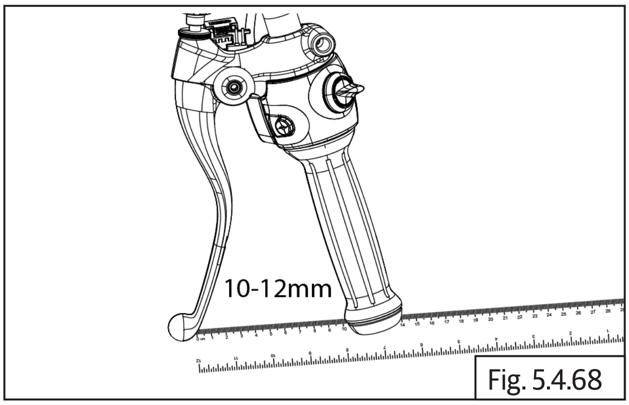

Fig. 5.4.68

- Actuate clutch lever three times and check for free play again for 10-12mm. Adjust if required.
- Check gap of 3-6mm at adjuster nut at cable end. If found to be irregular, adjust at engine end.

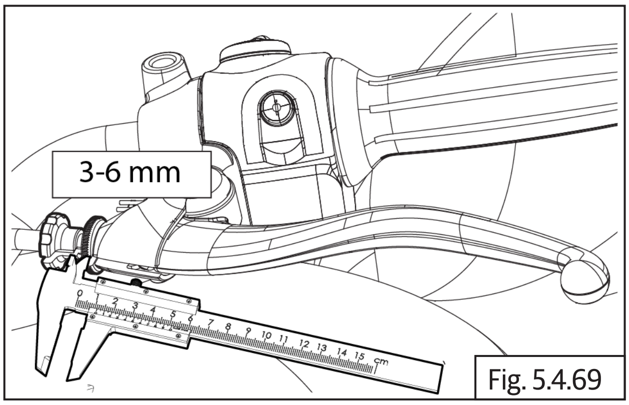

Fig. 5.4.69

- Position steering in straight position. Acutate clutch lever three times and check for free play of 10-16 mm.

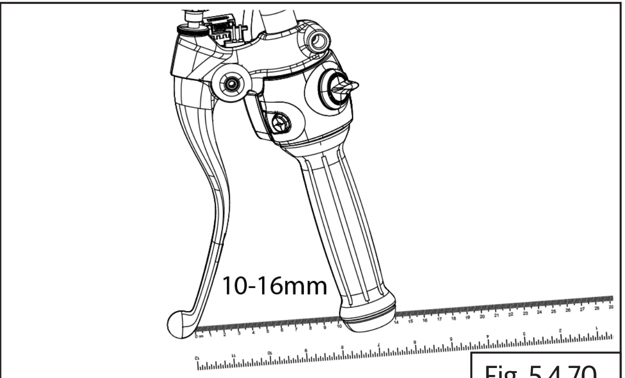

Fig. 5.4.70

- Ensure there is free hand movement at clutch actuating arm when the handlebar is at full left position

5.3.24. Battery Connections

NOTE
• *Ensure ignition and stop switches are in OFF position before connecting battery cables.*

- Connect battery positive (+) terminal **(a)** and tighten Hex head bolt **(M6)**.

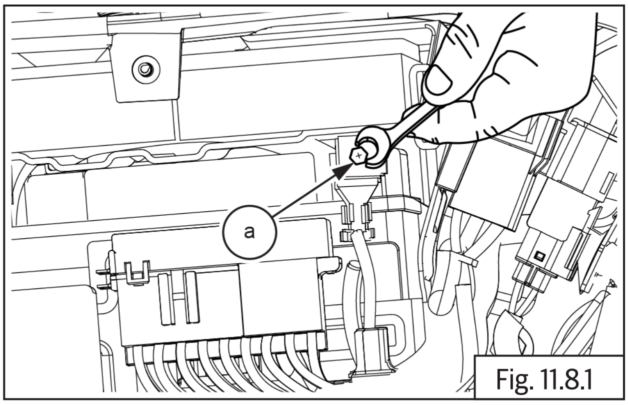

Fig. 11.8.1

🔧	10 mm Double end spanner

- Connect battery negative (-) terminal **(a)** and tighten Hex head bolt **(M6)** in battery **(b)**.

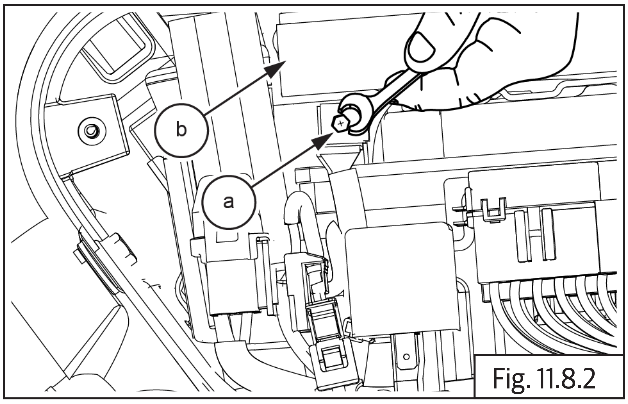

Fig. 11.8.2

🔧	10 mm Double end spanner

- Clean and apply recommended agents on battery terminals.

5.3.25. Rider Seat Assembly on Frame

- Ensure mounting holes **(a)** of the seat are aligned with frame.

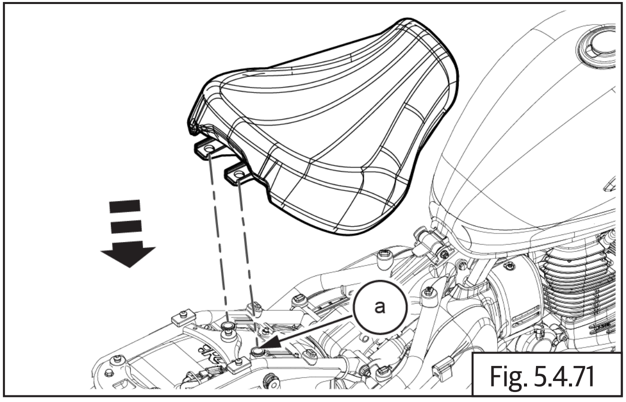

Fig. 5.4.71

- Place the grommet **(c)** and spacer **(b)** over the grove and insert the bolts **(a)** and tighten it.

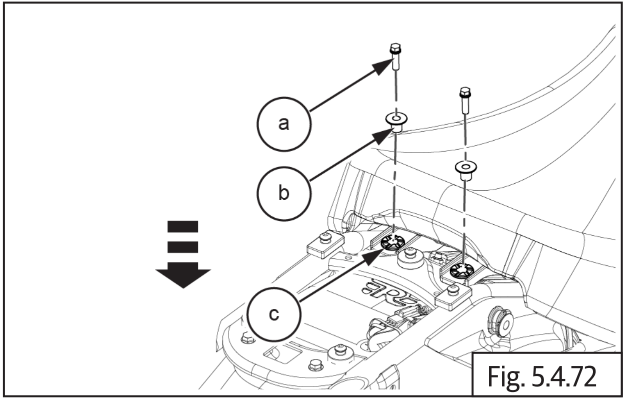

Fig. 5.4.72

	10 mm Socket with Ratchet
Torque	8-12Nm/0.8-1.2 Kgf-m

5.3.26. Pillion Backrest and Seat Assembly on Frame

- Locate the pillion seat **(a)** over the frame.

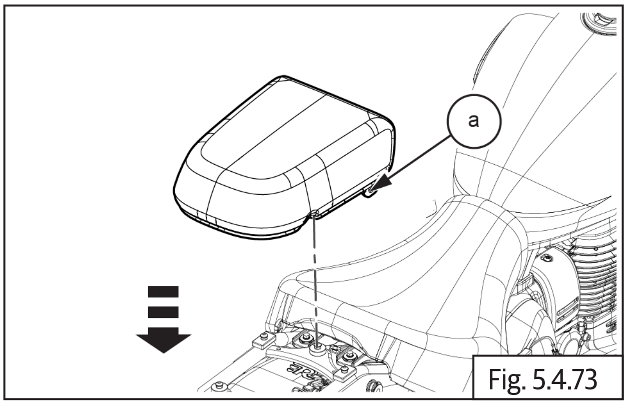

Fig. 5.4.73

- Locate the grab rail **(a)** over the pillion seat and make sure the holes are aligned.

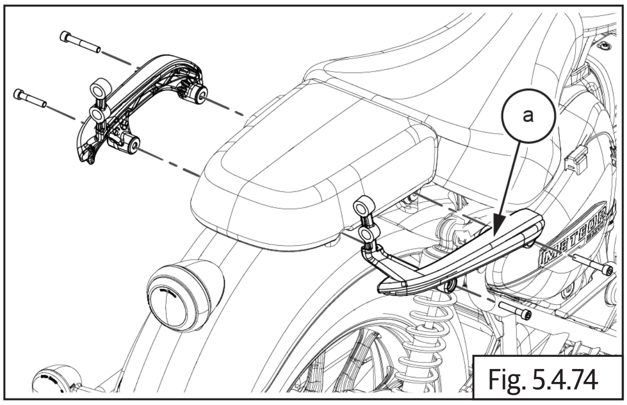

Fig. 5.4.74

- Insert the bolts **(a)** and tighten it.

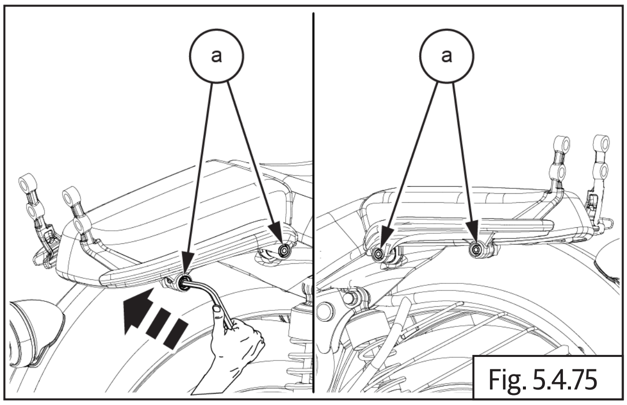

Fig. 5.4.75

	6 mm Allen Socket with Ratchet

- Align the back **(a)** and front **(b)** pad of backrest with mounting holes. .

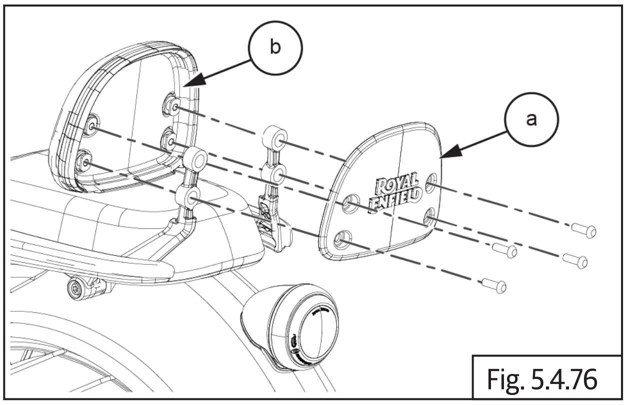

Fig. 5.4.76

- Insert mounting bolts (a) and tighten it.

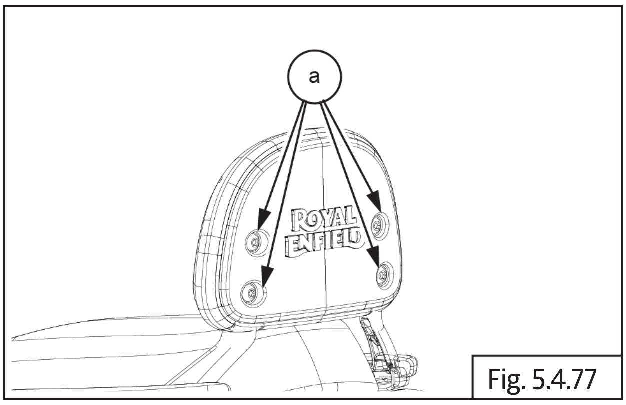

Fig. 5.4.77

🔧	5 mm Allen Socket with Ratchet

5.3.27. Side Panel LH

- Locate LH panel from bottom to fit into frame **(a)**.

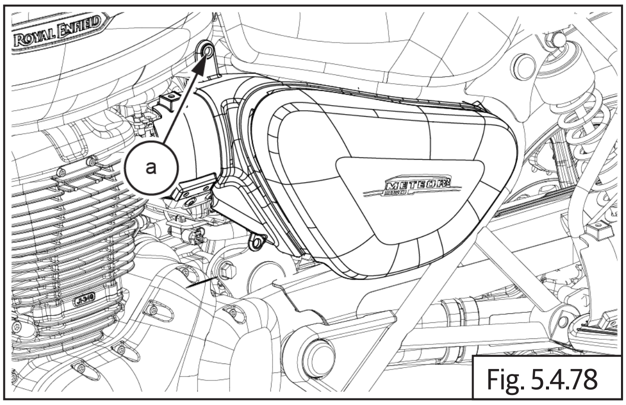

Fig. 5.4.78

- Locate LH side panel fitting bolts **(a)** and tighten.

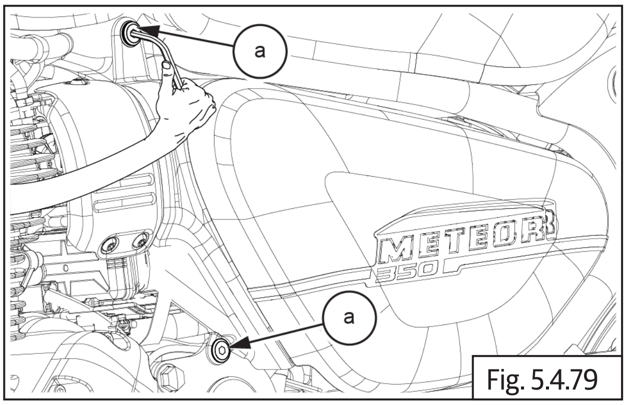

Fig. 5.4.79

🔧	5 mm Allen Key

5.3.28. Side Panel RH

- Locate side panel RH into frame and lock in its position.
- Insert ignition key **(a)** into side panel RH **(b)** and turn in anticlockwise direction to lock RH side panel.

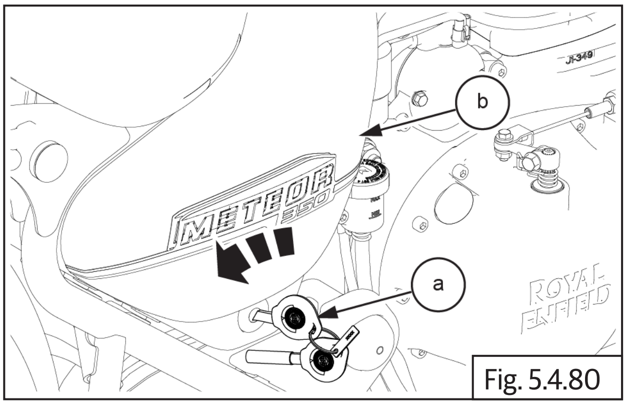

Fig. 5.4.80

5.3.29. Drain Bolt and Engine Oil Re-fill

- Insert strainer **(a)** along with O-ring **(b)** strainer cap **(c)** and bolt **(d) (M6)**.

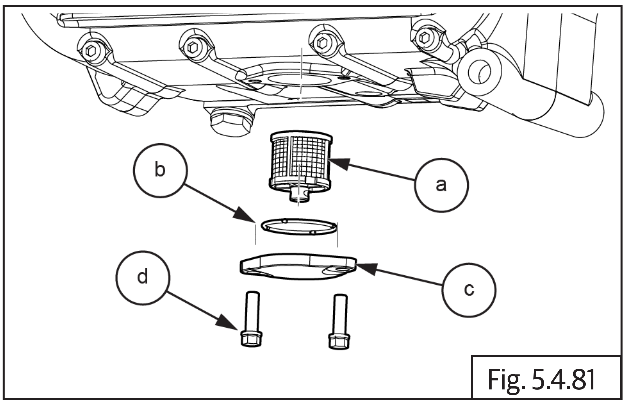

Fig. 5.4.81

Dry Fill	2.5 Liters / 0.55 Imperial gallon
Grade	SAE 15W50 APISL, JASO MA2, SEMI SYNTHETIC

🔧	8 mm Socket with Ratchet
Torque	8-12 N-m/0,8-1.2 kgf-m

- Refill engine oil with recommended quantity.

- Assemble engine oil filler cap **(a)**.

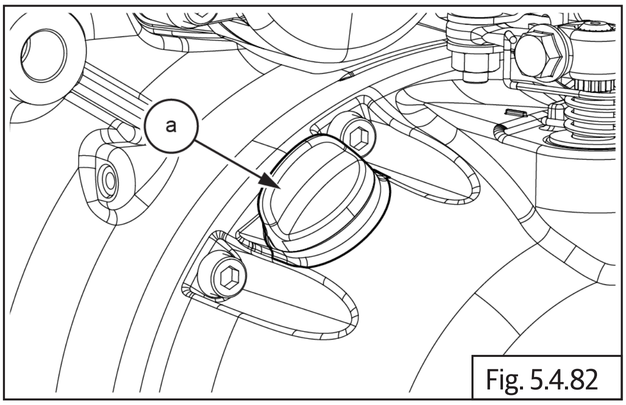

Fig. 5.4.82

- Start and warm up engine for 2 to 3 minutes and then turn it off.

- Check oil level through oil level window.

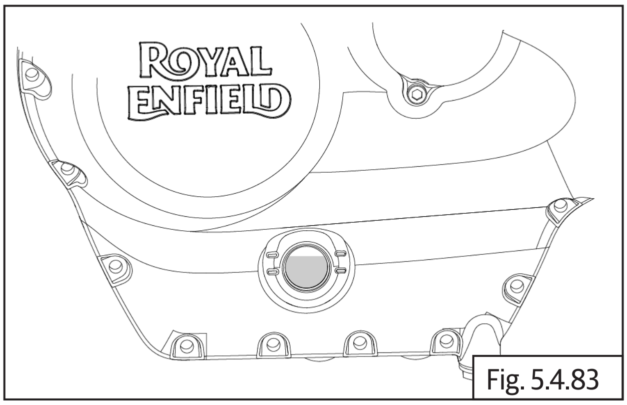

Fig. 5.4.83

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5.4 Engine Dismantling

NOTE
- *Ensure the engine is properly clamped on the holding fixture on a worktable.* - *Ensure the engine is clean and free of any oil residue/dirt. Clean engine with recommended degreasing agents/solvents to remove oil residue/dirt.* - *Ensure worktable is clean and atmosphere is dust free.*

5.4.1. Drain Plug

- Loosen and remove oil filler cap **(a)** from the crankcase top on the RH side.
- Use an adjustable plier with soft jaws to unscrew filler cap if necessary.

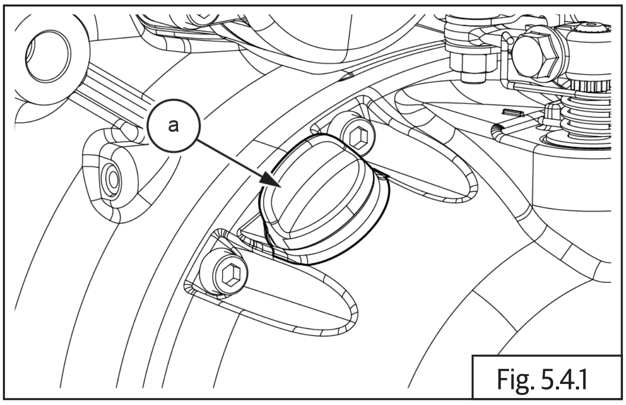
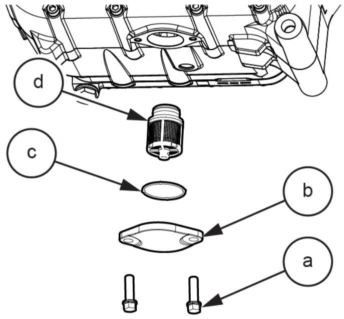


Fig. 5.4.1

🔧	Nose Plier

- Place a tray under the engine.
- Remove the oil strainer cap bolt **(a) (M6)**.
- Remove the oil strainer cap **(b)** along with O-Ring **(c)** and oil strainer **(d).**



🔧	8 mm Socket with Ratchet

⚠ WARNING
Do not spill oil . Collect used oil in a seperate container and dispose it through authorized disposal agencies in your locality. Avoid skin OR body contact with the oil. Promptly wash affected area with soap and water.

NOTE
- *Ensure the engine oil is drained completely.* - *After draining the oil suitably cover the oil filler cap hole to prevent debris.*

5.5.2. Oil Filter

- Remove 3 Nos. **(M6)** bolts **(a)**.

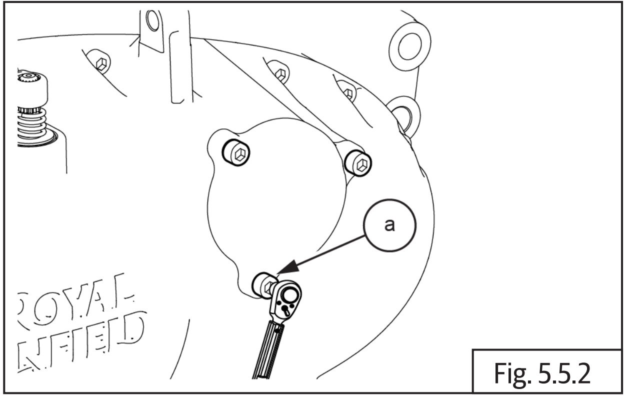


Fig. 5.5.2

🔧	8 mm socket with Ratchet

- Gently remove oil filter cover **(a)** along with O-ring **(b)**.
- Gently shake and remove the oil filter **(c)** from cover RH

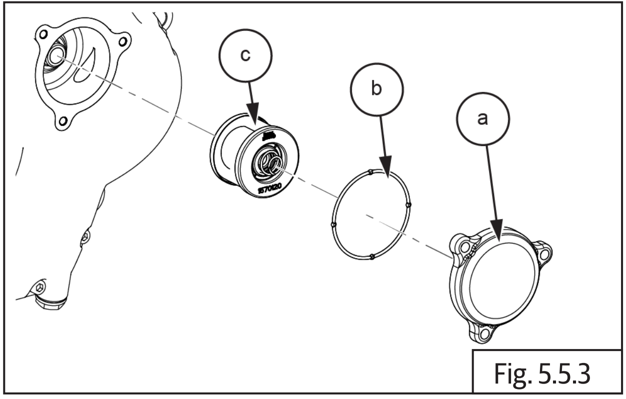


Fig. 5.5.3

5.5.3. Throttle Body

- Loosen and remove 2 Nos **(M5)** **(a)** allen bolt holding the throttle body.
- Gently pull out the throttle body **(b)** along with rubber manifold **(c)** .

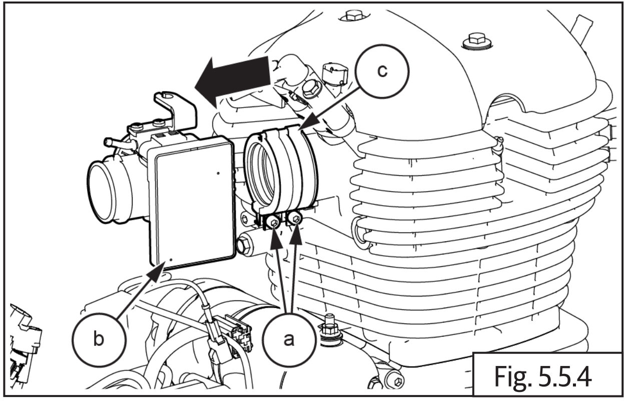


Fig. 5.5.4

🔧	4 mm Allen socket with Ratchet

5.5.4. Injector

- Remove 2 Nos **(M6)** injector mounting bolts **(a)**.

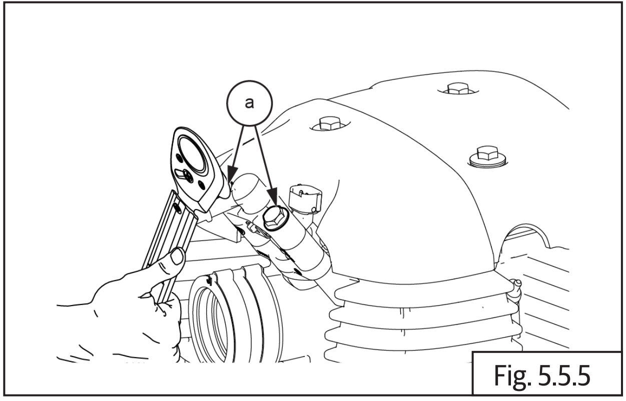


Fig. 5.5.5

🔧	10 mm socket with Ratchet

- Pull out the injector to remove.

⚠ CAUTION

- **Store the injector in a clean and dry place. Make sure that the injector is not damaged.**
- **Place the injector in a plastic bag to avoid dust entry.**

5.5.5. Spark Plugs

⚠ CAUTION

Before removing the spark plugs, blow away any dirt accumulated in the spark plug area with compressed air to prevent it from falling into cylinder head.

- Loosen and remove spark plug **(a)** from cylinder head.

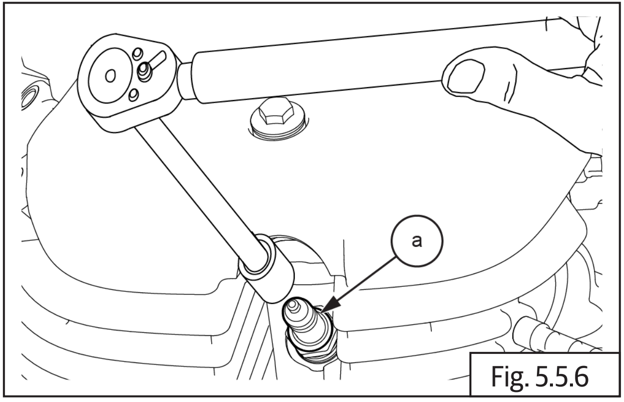


Fig. 5.5.6

16 mm Deep Socket with Ratchet

- Remove the spark plug and washer gently from its position.

5.5.6. Engine Oil Temperature Sensor

- Loosen and remove the engine oil temperature sensor **(a)** from its mounting.

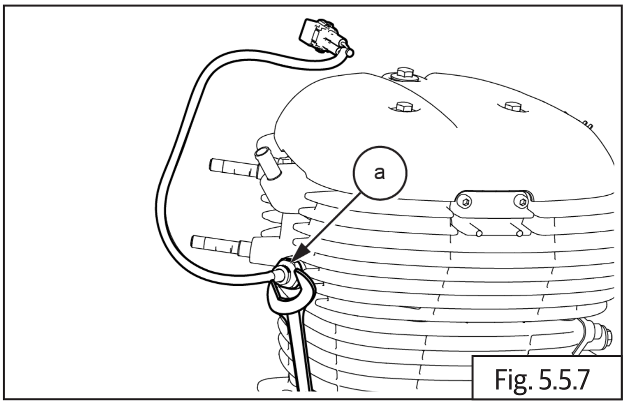


Fig. 5.5.7

- Gently pull out the engine oil temperature sensor along with the O-Ring

18mm Open End Spanner

5.5.7. Starter Motor

- Loosen and remove 2 Nos. allen bolts **(M6) (a)**. and remove body ground winglet.

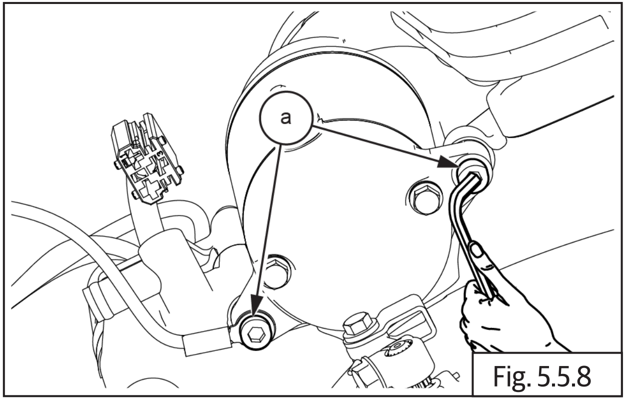


Fig. 5.5.8

5 mm Allenkey with Ratchet

- Gently remove the starter motor **(a)** from engine.

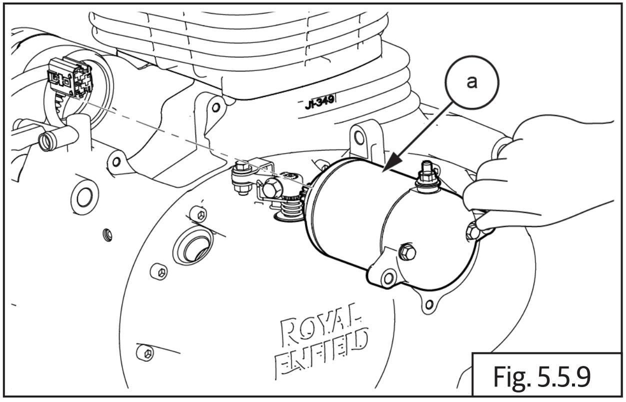


Fig. 5.5.9

NOTE

- **DO NOT** *tap on the starter motor while removing it. Tapping may damage the internal components.*

5.5.8. Breather Hose

- Remove the Circlip **(a)** on the breather **(b)** and gently pull it to remove.

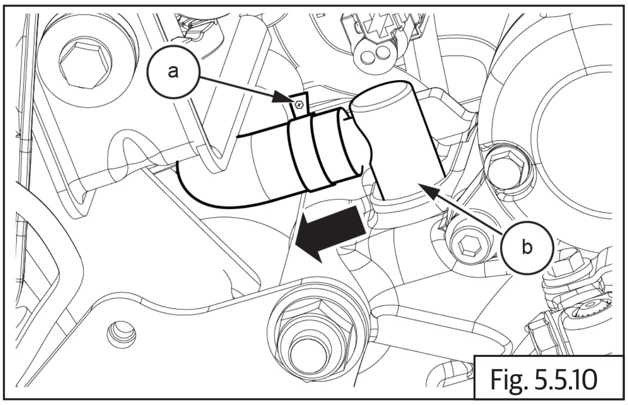
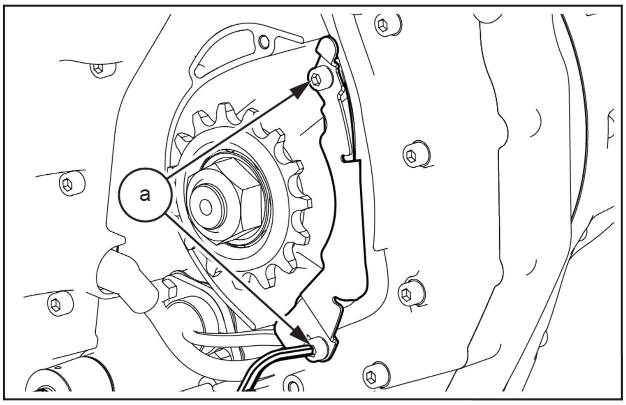


Fig. 5.5.10

	Nose Plier

5.5.9. Gear Position Sensor

- Loosen and remove 2 Nos. Hex head bolts **(M6)** **(a)** and remove retainer plate.



	8 mm Socket with Ratchet

- Remove 2 Nos. hex bolts **(M5)** **(a)** mounted on gear position sensor.

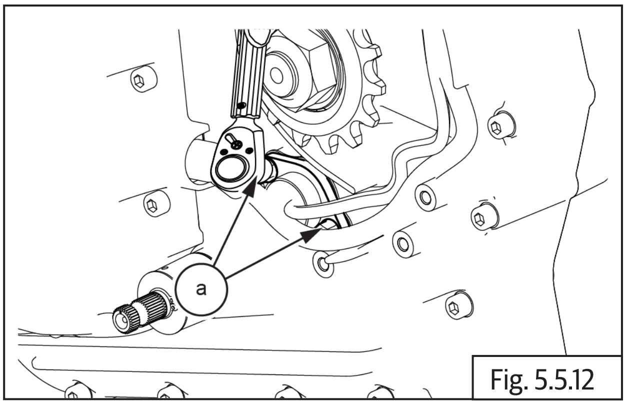


Fig. 5.5.12

	8 mm Socket with Ratchet

- Gently tap Gear Position Sensor **(a)** and remove along with O-ring **(b)**.

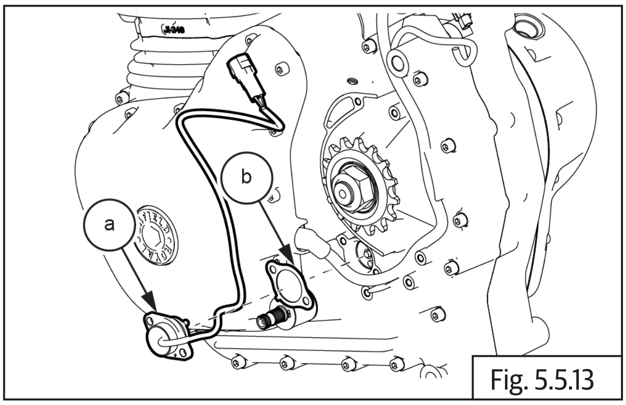


Fig. 5.5.13

5.5.10. Clutch Actuating Lever Assembly

- Rotate clutch actuating lever **(a)** in anti clockwise direction to release tension in spring **(b)**.

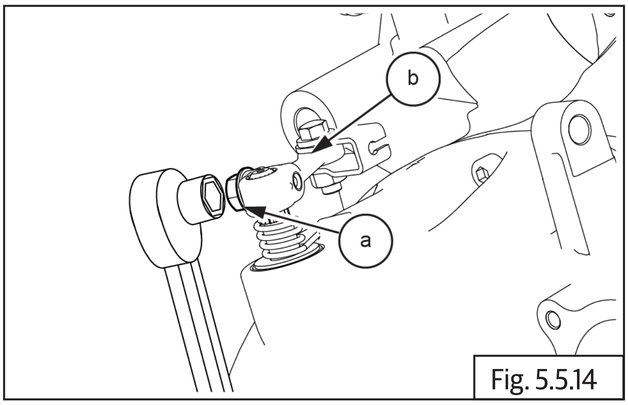


Fig. 5.5.14

	10 mm Socket with Ratchet

- Loosen and remove Hex head bolt **(M6) (a)** from clutch actuating lever assembly **(b)**.

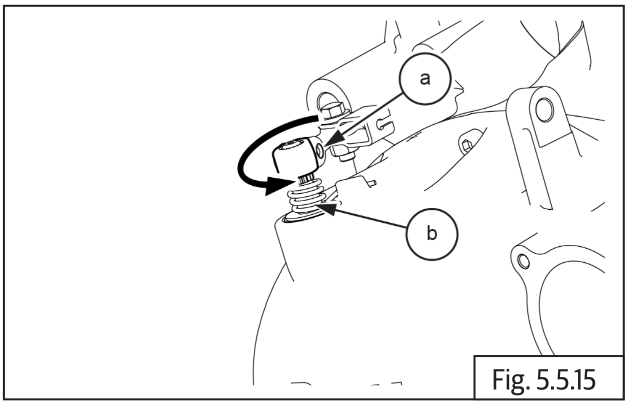


Fig. 5.5.15

	10 mm Socket with Ratchet

- Remove clutch actuating lever **(a)** and spring from clutch shaft **(b)** on RH cover.

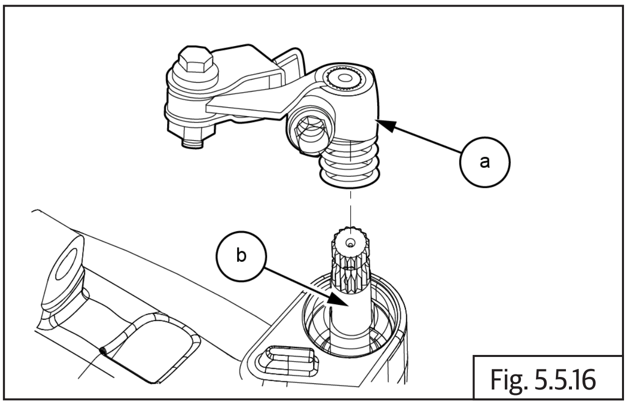


Fig. 5.5.16

	Wedge

NOTE

- *Use a suitable wedge to slightly expand the slot in the clutch actuating arm and gently lift from the shaft.*

5.5.11. Cover RH

- Remove 18 Nos. Bolts **(M6) (a)** in the sequence mentioned below to remove cover RH **(b)**.

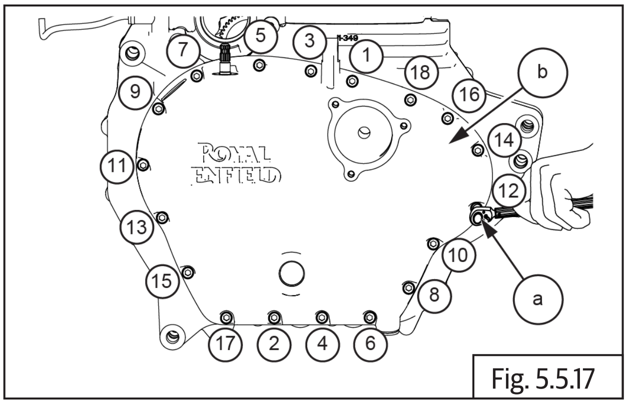


Fig. 5.5.17

	5 mm Allen socket with Ratchet

- Adjust the clutch actuating arm to and fro with hand to remove the cover RH **(a)** along with gasket **(b)**.

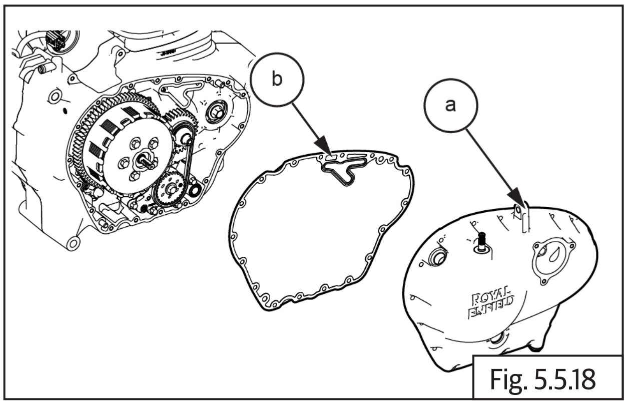


Fig. 5.5.18

⚠ CAUTION

Do not use a sharp tool to scrap the gasket material from the joint faces.

If required scrap only with a soft and blunt tool.

5.5.12. Clutch Actuating Shaft

- Gently remove the E clip **(a)** and washer **(b)** from the bottom of the clutch actuating shaft inside clutch cover.

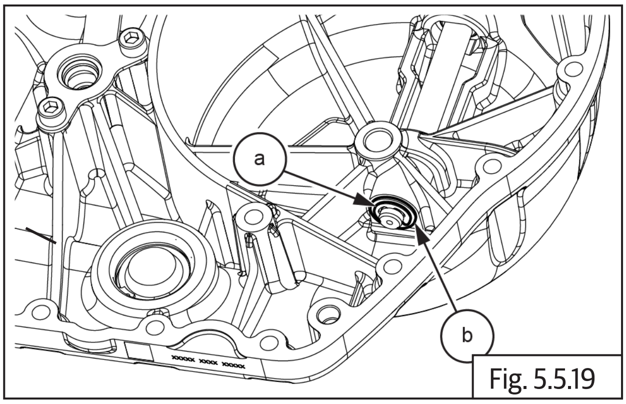


Fig. 5.5.19

🔧	Nose plier

- Remove oil seal **(a)** along with washer **(b)** from cover RH.

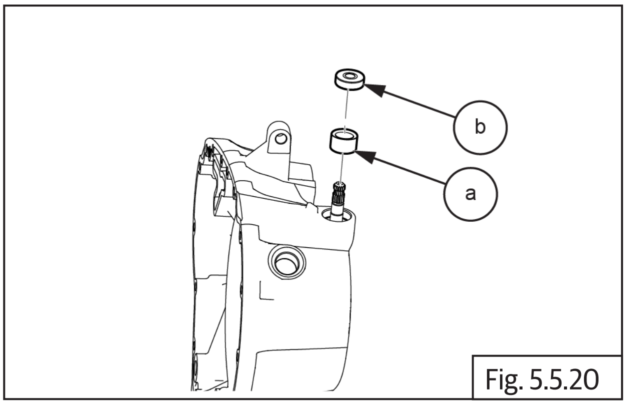


Fig. 5.5.20

- Gently pull out clutch actuating shaft **(a)** from cover RH**(b)**.

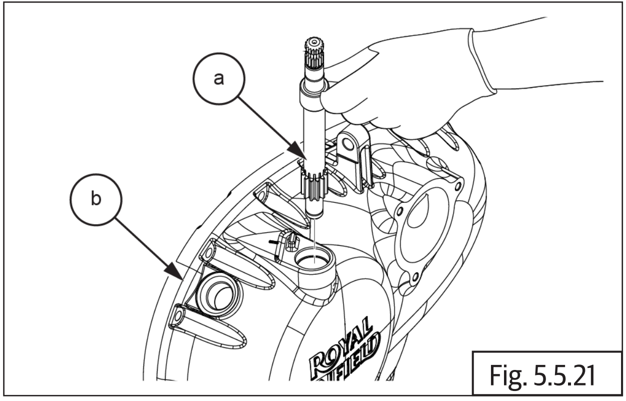


Fig. 5.5.21

5.5.13. Oil Level Window

- Remove the circlip **(a)** on the oil level window inside clutch cover.

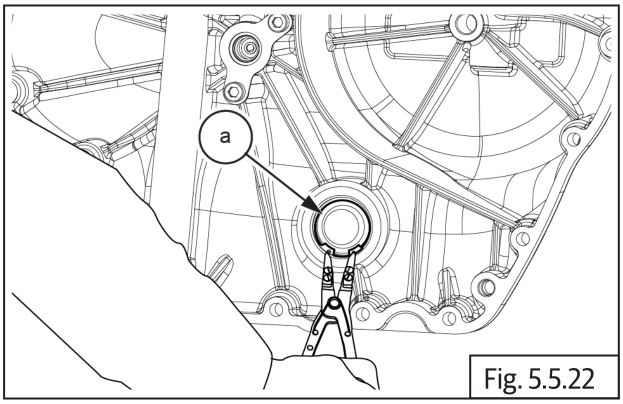


Fig. 5.5.22

🔧	Circlip plier

- Gently press oil window **(a)** from outer side to remove from clutch cover.

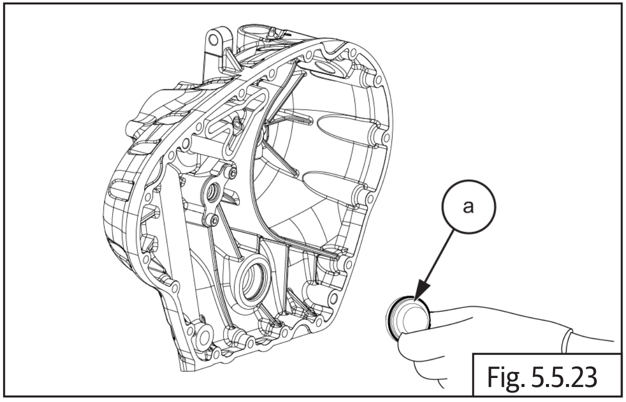


Fig. 5.5.23

5.5.14. Oil Bypass seal

- Loosen and remove 2 Nos **(M6)** allen bolts **(a)** along with the retainer plate **(b)**.

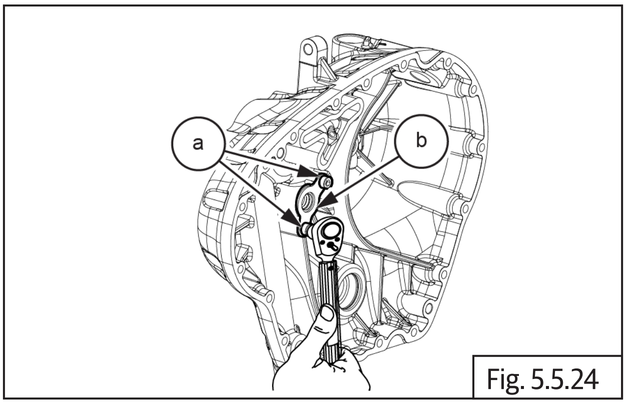


Fig. 5.5.24

🔧	5mm Allen Socket with Ratchet

- Gently remove the oil seal **(a)** from the cover RH using a screw driver.

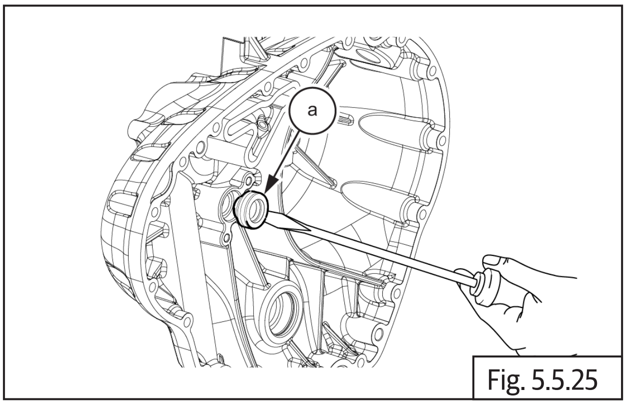


Fig. 5.5.25

🔧	Screw Driver

5.5.15. Transmission Jet

NOTE
- *Ensure gearbox is in neutral condition*

- Loosen and remove transmission jet **(a)** from the crankcase.

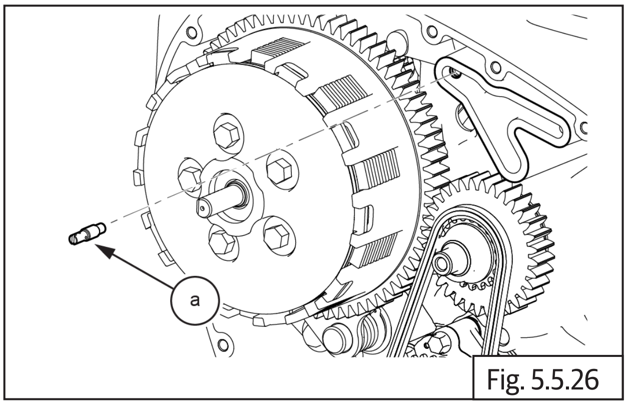


Fig. 5.5.26

🔧	Screw Driver

5.5.16. Oil Pump

- Loosen and remove Hex flange bolt **(M6) (a)** on oil pump sprocket along with washer.

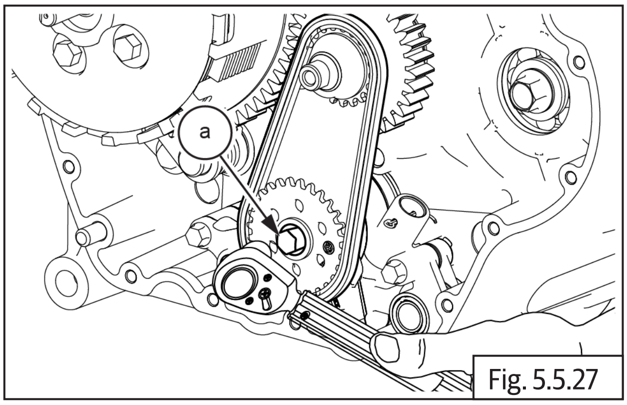


Fig. 5.5.27

🔧	10 mm Socket with Ratchet

- Remove oil pump sprocket **(a)** along with the chain **(b)**.

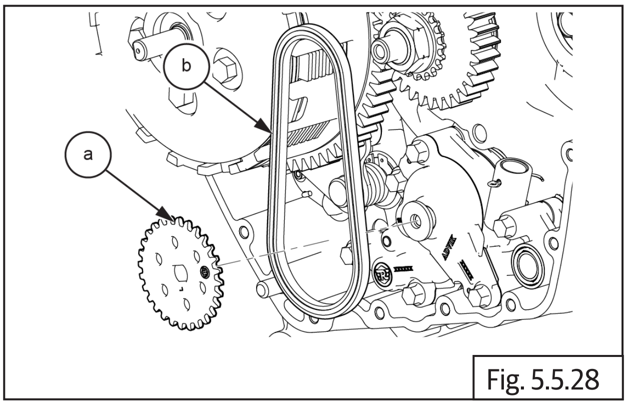


Fig. 5.5.28

- Remove 6 Nos. Hex flange head bolts **(M6) (a)** in crisscross pattern.

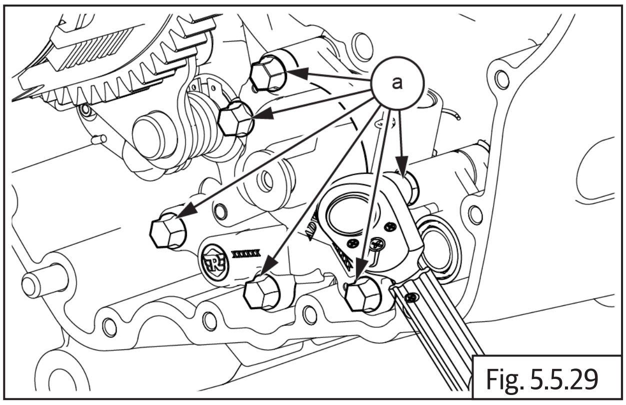


Fig. 5.5.29

🔧	8 mm Socket with Ratchet

- Remove oil pump **(a)** along with the metal gasket **(b)**.

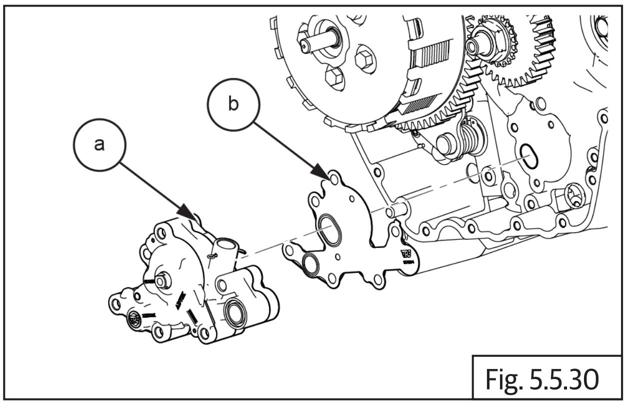


Fig. 5.5.30

NOTE

- *The oil pump does not have any serviceable parts, hence as to be replaced only as a complete assembly.*

5.5.17. Balancer Shaft Bolt

⚠ CAUTION

- **Refer section 5.5.30 to remove cover LH and to loosen magneto rotor bolt.**
- **It is not be possible to remove the magneto rotor once the clutch assembly is removed.**
- **Do not dismantle the magneto rotor completely before removing the cylinder head assemby.**

- Locate the special tool **(a)** between clutch housing and crank gear.

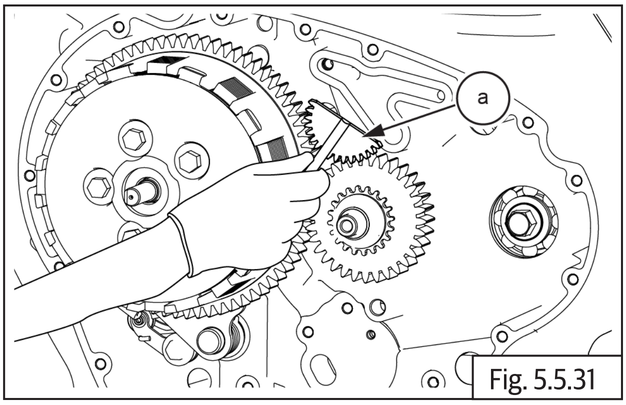
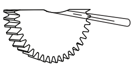


Fig. 5.5.31

SPL 	Part No: ST30922/A Part Name: Crank Lock Tool

- Remove balancer shaft bolt **M10 (a)** along with two washers.

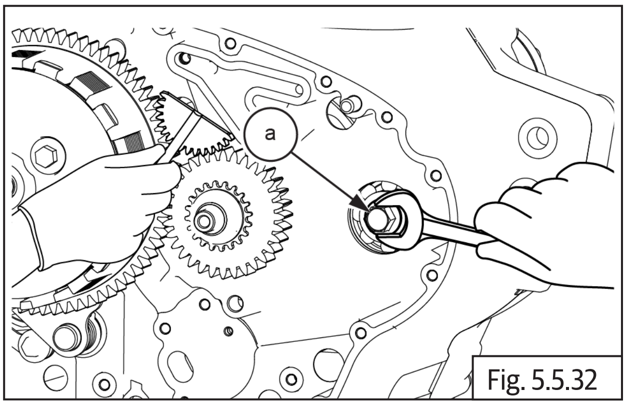


Fig. 5.5.32

🔧	14 mm Socket with Ratchet

5.5.18. Crankshaft Nut

⚠ CAUTION
Crank nut is a left hand thread. Wrong rotation may damage the threads.

- Locate the special tool **(a)** between clutch housing and crank gear.

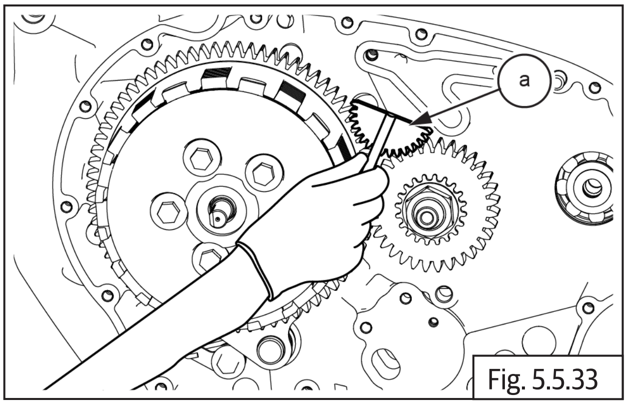
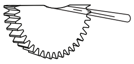


Fig. 5.5.33

SPL	Part No: ST30922/A
	Part Name: Crank Lock Tool

- Remove crankshaft nut **(a)** along with two washers **(b)** and oil pump drive sprocket **(c)**.

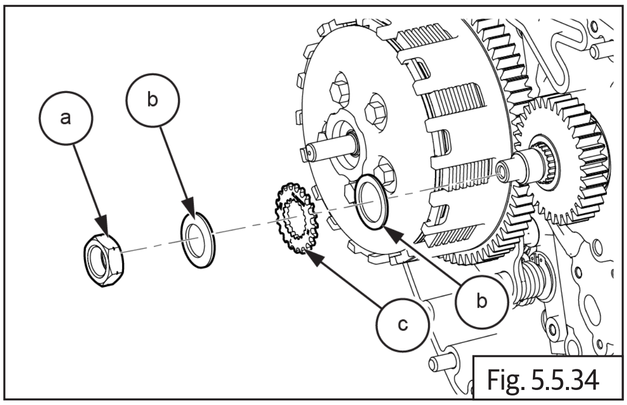


Fig. 5.5.34

🔧	24 mm Socket with Ratchet

- Remove the crankshaft gear **(a)**.

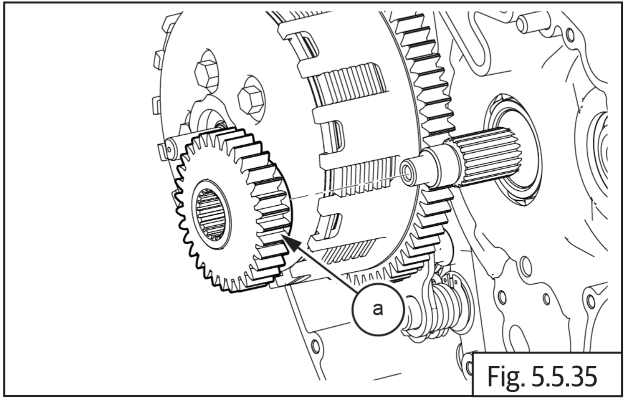


Fig. 5.5.35

5.5.19. Clutch Assembly

⚠ CAUTION

Ensure gearbox in neutral position.

- Mark the position of clutch plates with a marker before dismantling.

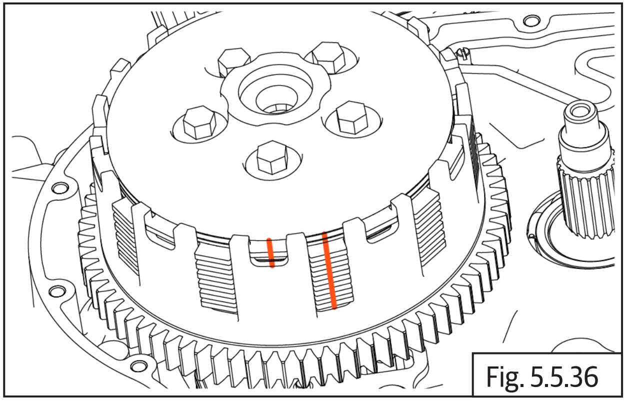


Fig. 5.5.36

- Loosen 5 Nos. **(M6)** Hex flange head bolts **(a).** Bolts are under spring tension, loosen bolts progressively and slowly in the star sequence.

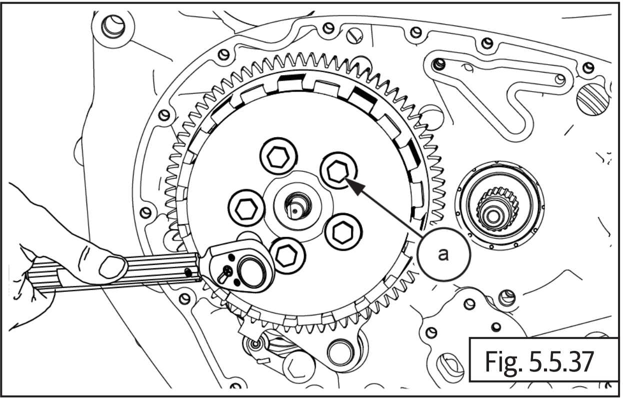


Fig. 5.5.37

10 mm Socket with Ratchet

- Hold pressure plate and remove the bolts with integrated washer **(a)**.
- Remove pressure plate along with clutch springs **(b)** and pin clutch relaease from clutch hub.

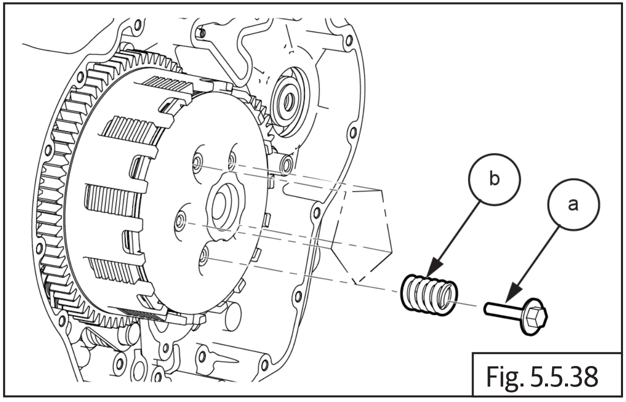


Fig. 5.5.38

- Remove pull rod **(a)** from clutch housing **(b)**.

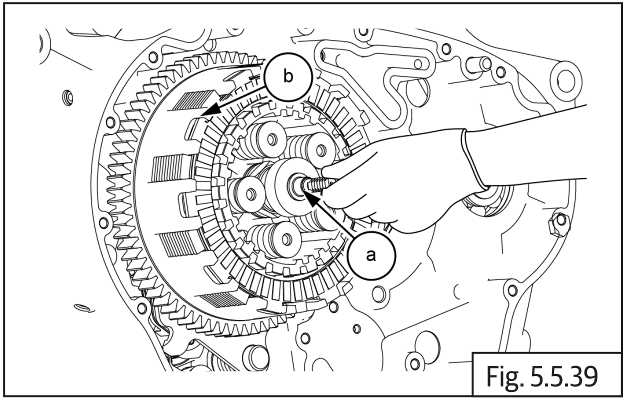


Fig. 5.5.39

- Remove friction plates **(a)** and steel plates **(b)** from clutch bell **(c)** located in clutch housing **(d)**.

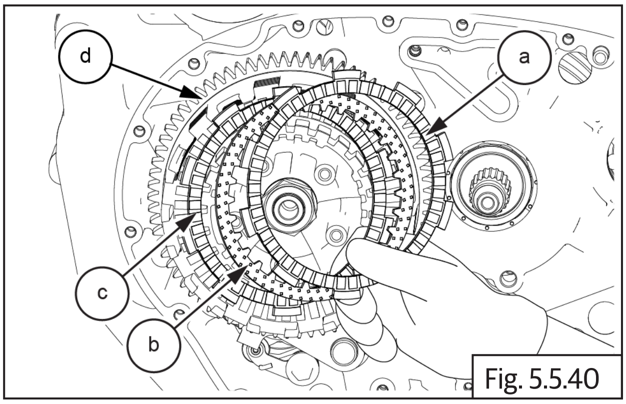


Fig. 5.5.40

⚠ CAUTION

Hex "U" nut is a left hand thread. Wrong rotation may damage the threads.

- Remove Hex U nut and washer from counter shaft.

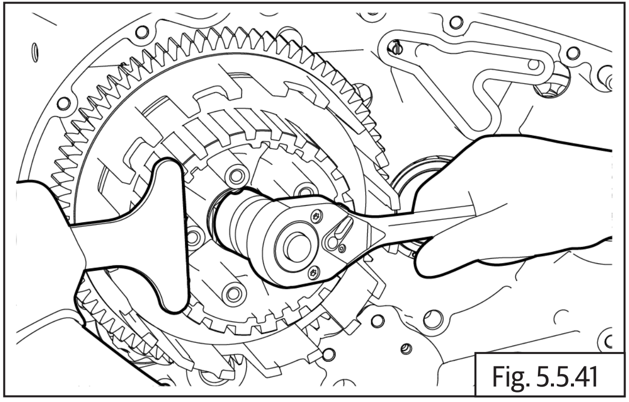


Fig. 5.5.41

SPL	
	Part No: ST30921/A
	Part Name: Clutch hub holder

	24 mm Socket with Ratchet

- Gently pull clutch bell to remove**.**

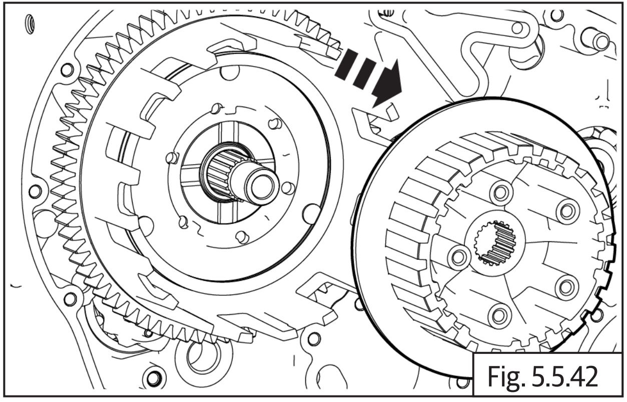


Fig. 5.5.42

- Remove washer **(a).**

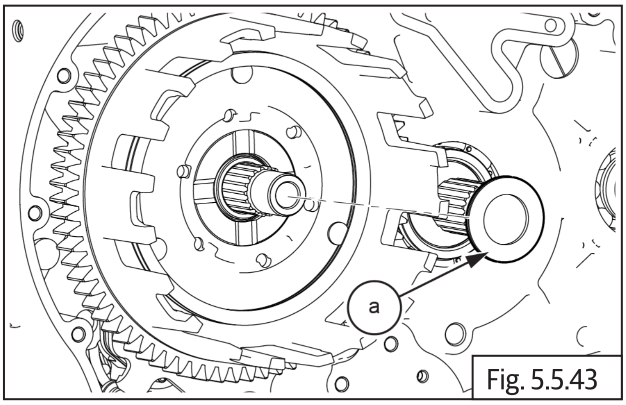


Fig. 5.5.43

- Remove clutch housing.

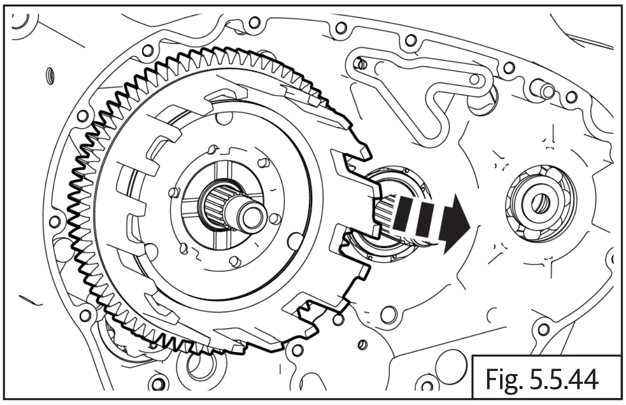
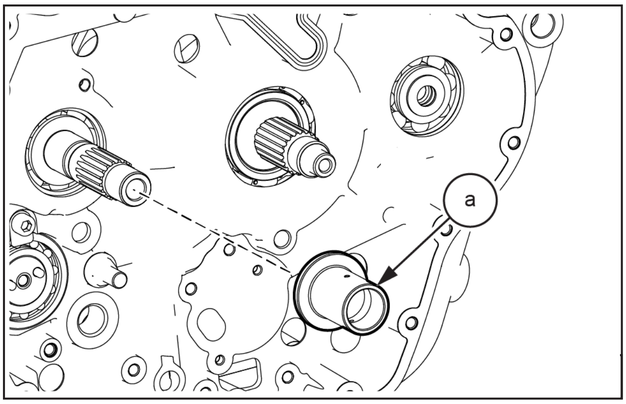


Fig. 5.5.44

- Remove spacer primary gear **(a)** from counter shaft.



5.5.20. Gear Shifter Shaft

- Remove the circlip **(a)** along with washer **(b)** and spacer **(c)** from shifter shaft **(d)** on engine LH side.

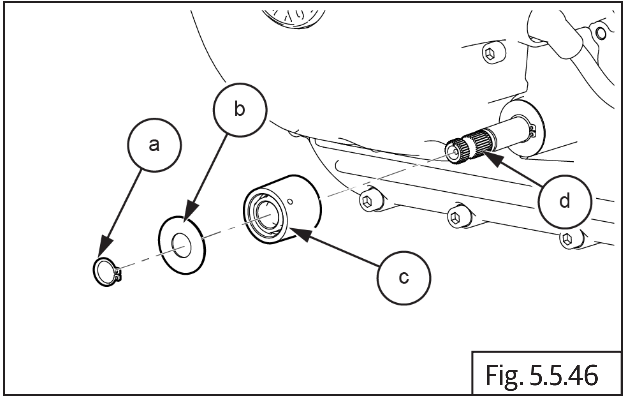


Fig. 5.5.46

🔧	Circlip plier

- Remove the circlip (a) along with washer (b) from shifter shaft (c) .

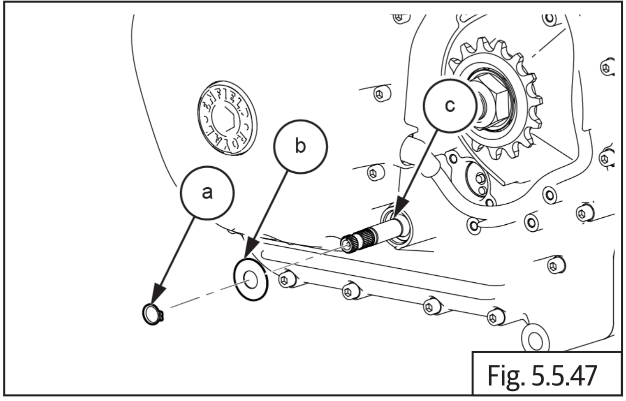


Fig. 5.5.47

- Gently pull out shifter shaft assembly **(a)** from engine RH side.

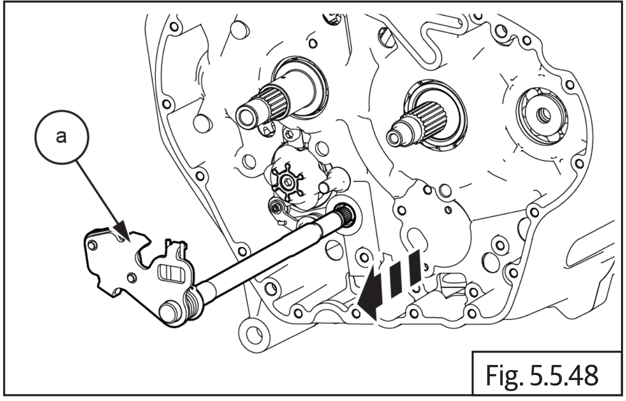


Fig. 5.5.48

- Remove circlip **(a),** washer **(b)** from longer end of shifter shaft **(c)**.

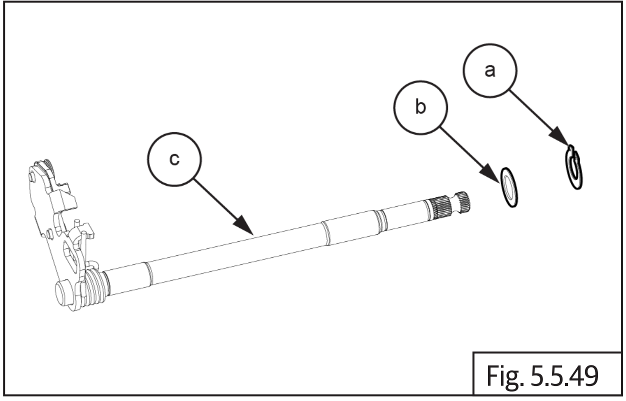


Fig. 5.5.49

- Expand spring legs and pull out spring **(a)** from longer end of shifter shaft **(b)**.

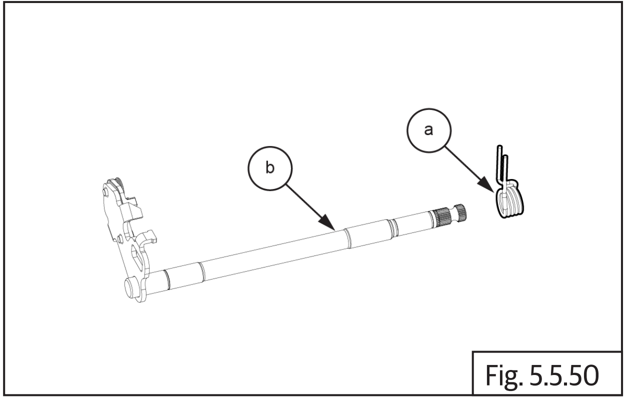


Fig. 5.5.50

5.5.21. Star Index Stopper

⚠ CAUTION
Spring loaded bolt. Support stopper while removing bolt.

- Loosen and remove Hex head bolt **(M6) (a)** from lower crankcase (RH) (clutch side).
- Remove stopper along with spring and washer.

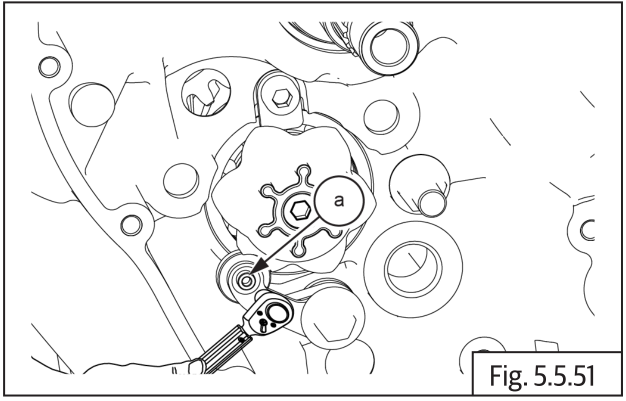


Fig. 5.5.51

🔧	10 mm Socket with Ratchet

- Remove stopper **(b)** along with bolt **(a)** washer **(c)** and spring **(d)**.

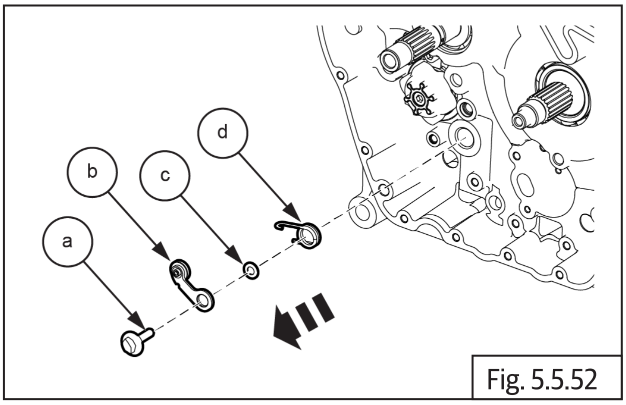


Fig. 5.5.52

5.5.22. Star Index

- Loosen and remove Hex socket head stepped bolt **(M6) (a)** on star index.

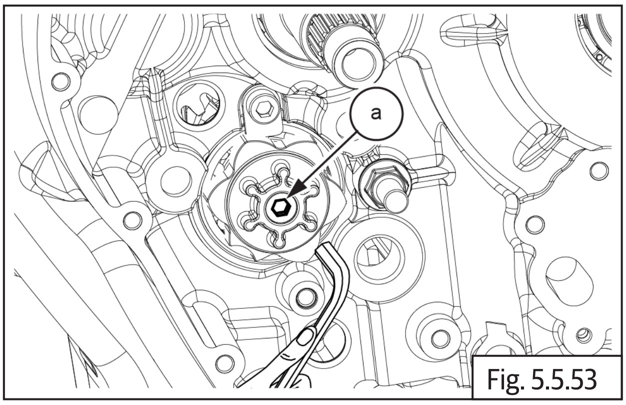


Fig. 5.5.53

	5 mm Allen socket with Ratchet

- Gently remove star index **(a)** along with 2 Nos pins **(b)**.

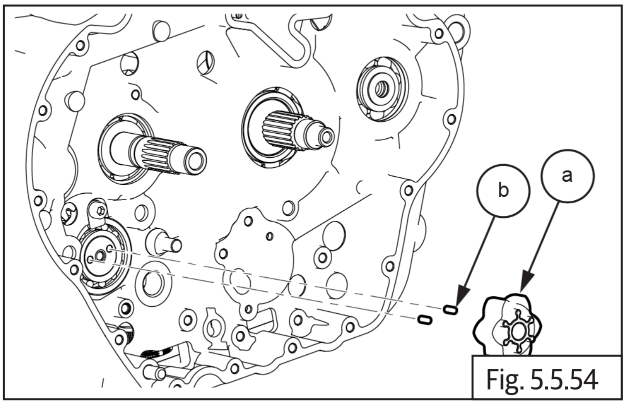


Fig. 5.5.54

5.5.23. FD Sprocket

- Unlock and release washer holder **(a)**.

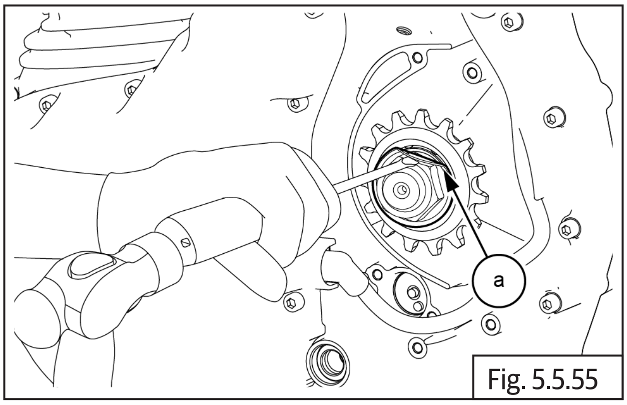
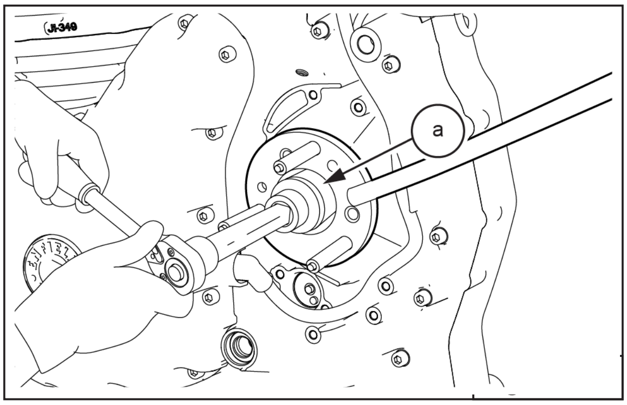
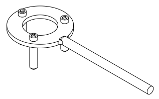


Fig. 5.5.55

	Chisel and Hammer

- Hold FD sprocket using special tool **(a)** and loosen "U" nut **(M20)**.



SPL 	Part No: ST-27534-2
	Part Name: FD sprocket holder

	30 mm Socket with Ratchet

- Remove lock tab washer **(a)** from shaft.

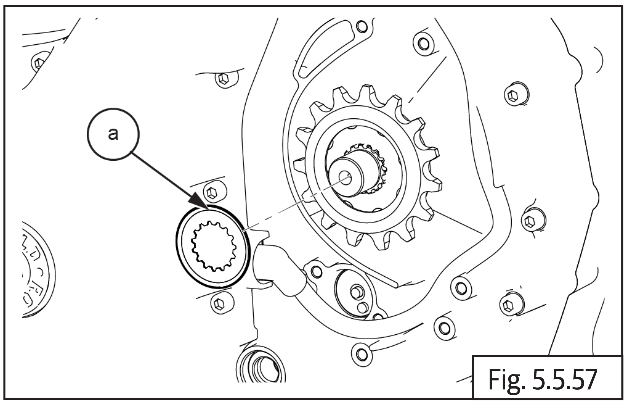


Fig. 5.5.57

- Remove FD sprocket **(a)** from drive shaft.

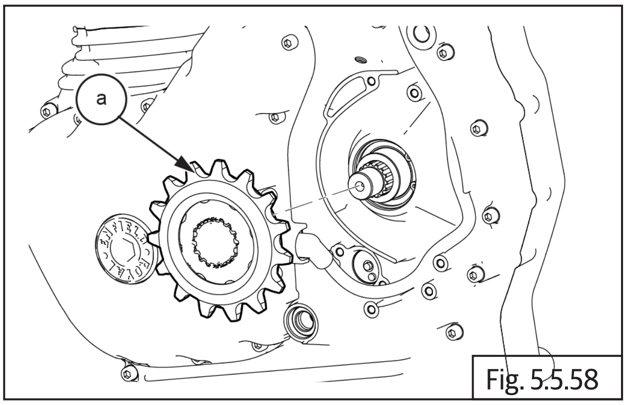


Fig. 5.5.58

5.5.24. Plug - Crankshaft Hole

- Remove the plug-crankshaft hole allen hex bolt **(a)** along with O-ring from center of cover LH **(b)**.

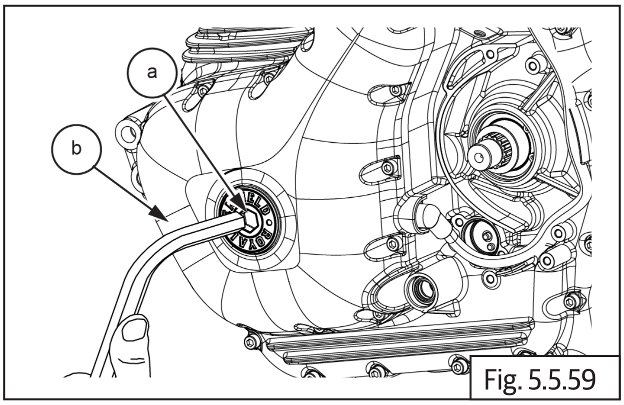


Fig. 5.5.59

🔧	14 mm Allen Socket with Ratchet

5.5.25. Cylinder Head Cover

- Loosen and remove 3 Nos. Hex flange head bolts **(M6) (a)** in crisscross pattern along with rubber seals and washers.

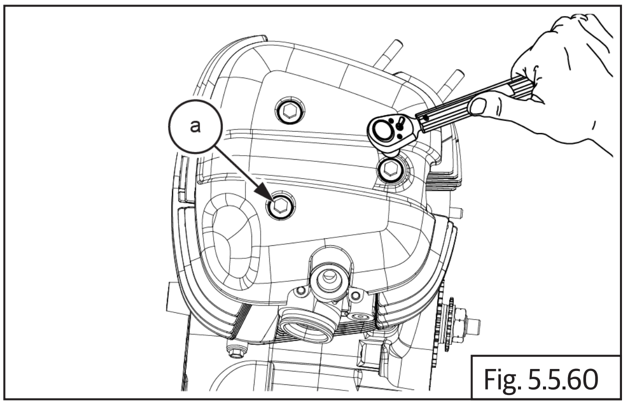


Fig. 5.5.60

🔧	10 mm Socket with Ratchet

- Gently remove rocker cover **(a)** from cylinder head **(b)**.

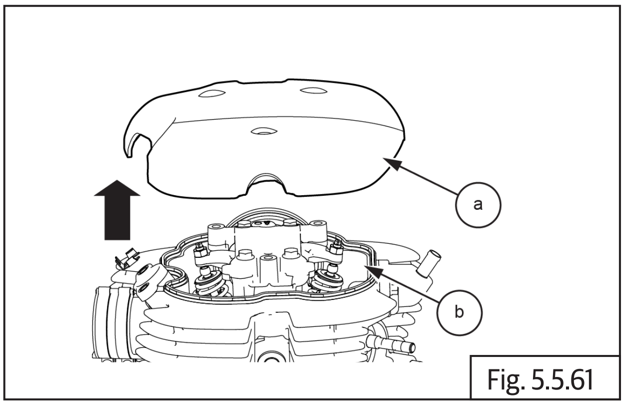


Fig. 5.5.61

- Remove rubber gasket **(a)** from cylinder head cover **(b)**.

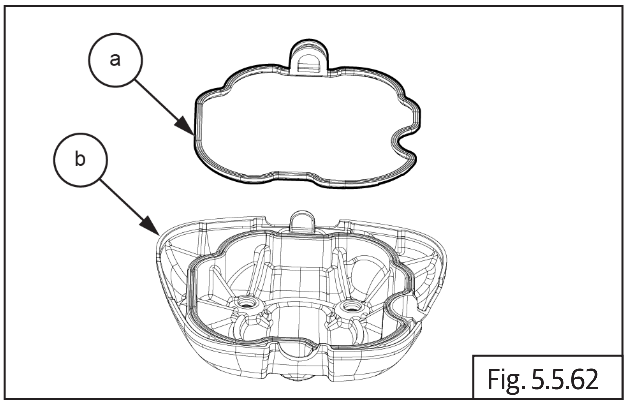


Fig. 5.5.62

- Loosen and remove 2 Nos. allen head bolts **(M4)** **(a)**.

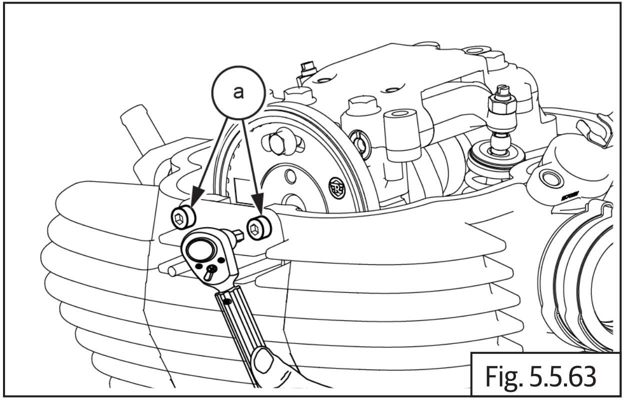


Fig. 5.5.63

3 mm Allen Socket with Ratchet

5.5.26. Auto Chain Tensioner

⚠ CAUTION

Before dismanling ensure piston at TDC.

- Loosen and remove center Hex flange bolt **(a)** from chain tensioner.

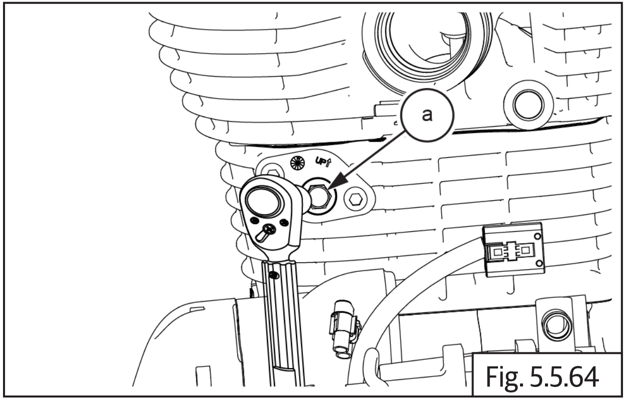


Fig. 5.5.64

12 mm Socket with Ratchet

- Loosen and remove 2 Nos. Allen bolts **(M6)** **(a)** from cylinder barrel **(b)**.

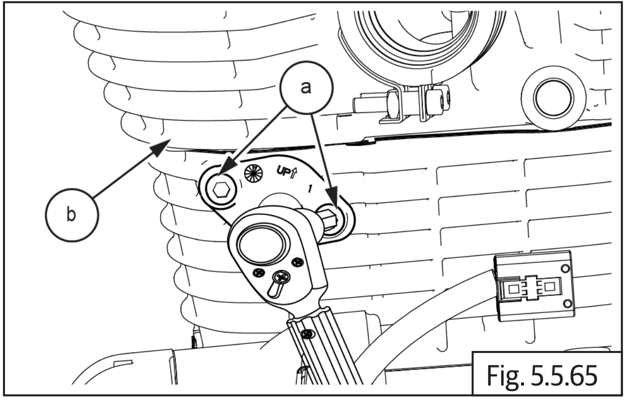


Fig. 5.5.65

5 mm Allen Socket with Ratchet

- Remove auto chain tensioner **(a)** from cylinder barrel along with gasket **(b).**

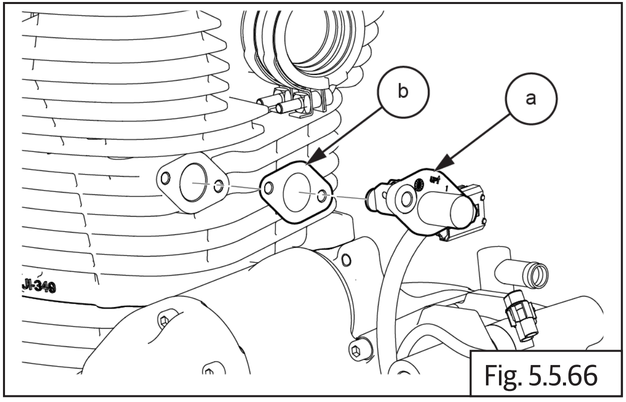


Fig. 5.5.66

5.5.27. Rocker Carrier

- Remove 4 Nos. hex flange carrier bolts M6 **(a).**

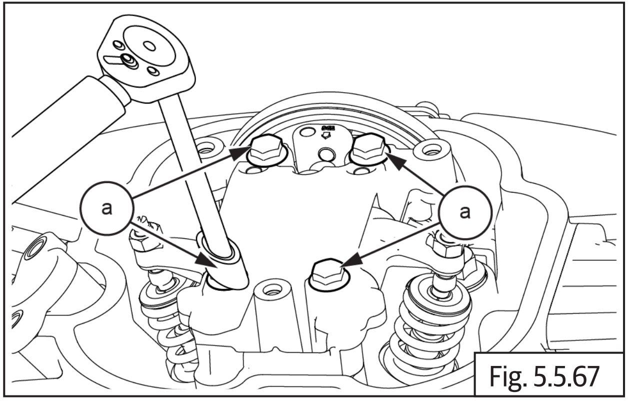


Fig. 5.5.67

🔧	10 mm Socket with Ratchet

- Remove the rocker carrier assembly **(a)**.

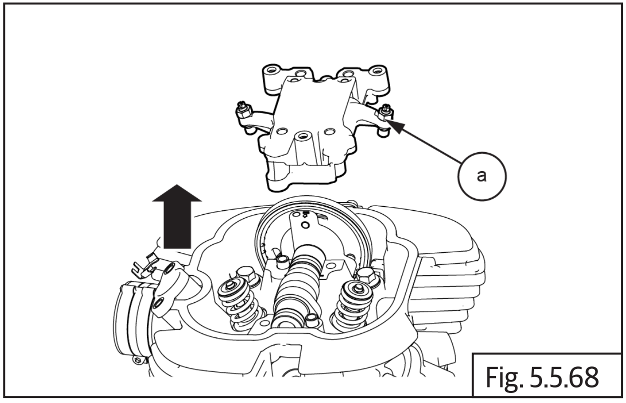


Fig. 5.5.68

- Remove 2 Nos dowel pins **(a)** rocker carrier assembly.

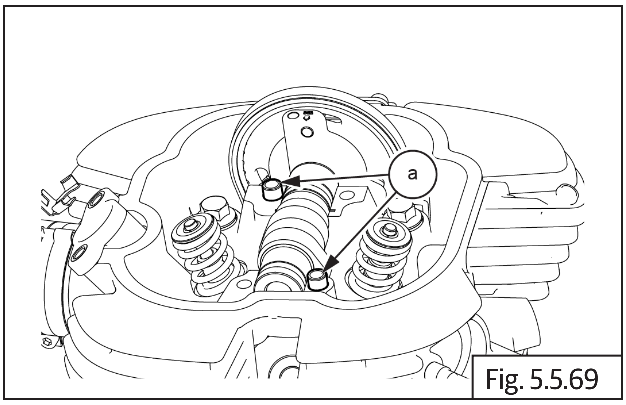


Fig. 5.5.69

5.5.28. Rocker Arms from Rocker Carriers

⚠ CAUTION

Mark the position of rocker arm and spindle to assemble in the same sequence.

- Gently pull out rocker shaft **(a)** from rocker carrier **(b)**, duly supporting the rocker arms.
- Remove rocker arms inlet and exhaust from the rocker carrier.

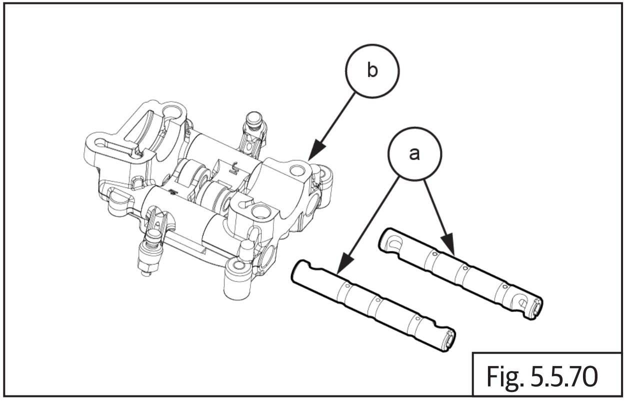


Fig. 5.5.70

5.5.29. Cam Shaft, Sprocket & Chain

- Rotate magneto rotor only in anti-clockwise direction, till one of the Hex head bolt on cam chain sprocket appears at the top most position.

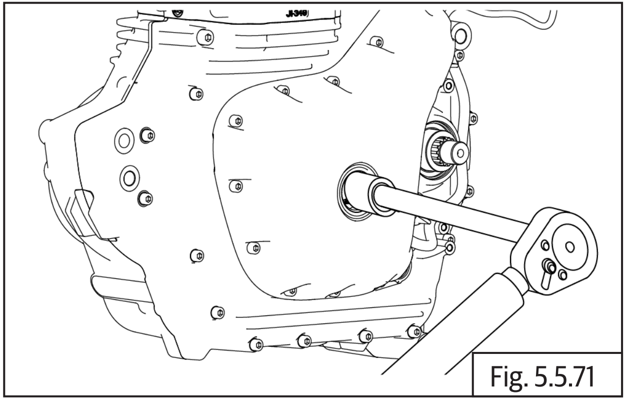


Fig. 5.5.71

🔧	17 mm Socket with Ratchet

- Loosen and remove 1st Hex head bolt **(M6) (a)** from cam sprocket.

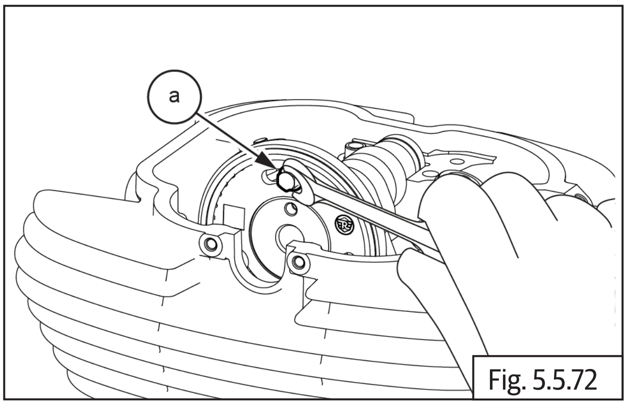


Fig. 5.5.72

🔧	8 mm Socket with Ratchet

- Rotate magneto rotor only in anti-clockwise direction, till the other Hex head bolt on cam chain sprocket appears at the top most position.

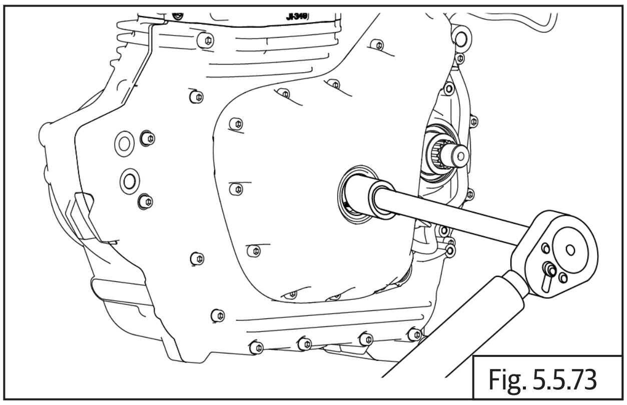


Fig. 5.5.73

🔧	17 mm Socket with Ratchet

- Loosen and remove 2nd Hex head bolt **(M6) (a)** from cam sprocket.

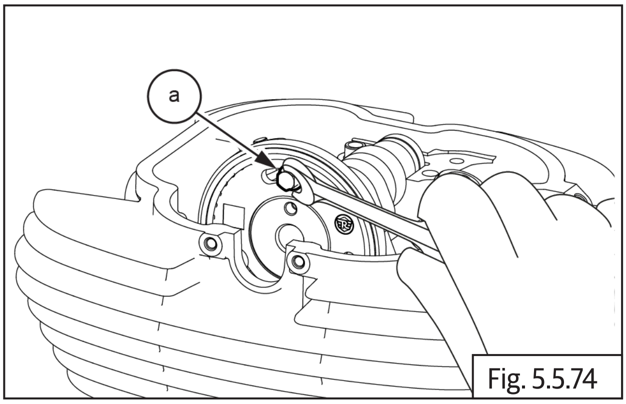


Fig. 5.5.74

🔧	8 mm Socket with Ratchet

- Remove cam chain **(b)** from cam sprocket **(a)** to remove cam sprocket.

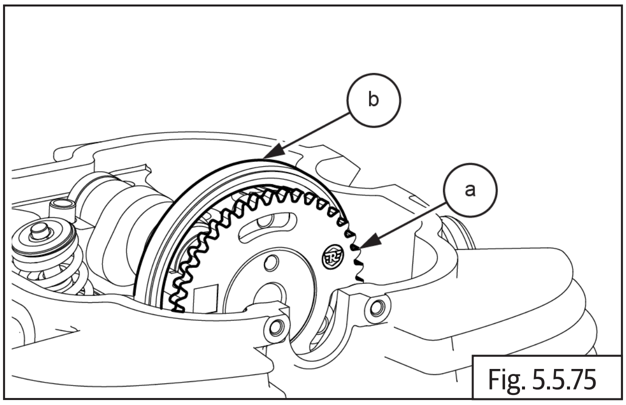


Fig. 5.5.75

⚠ CAUTION

Support timing chain suitable so that it does not fall into the crankcase.

- Remove camshaft **(a)** from cylinder head **(b)**.

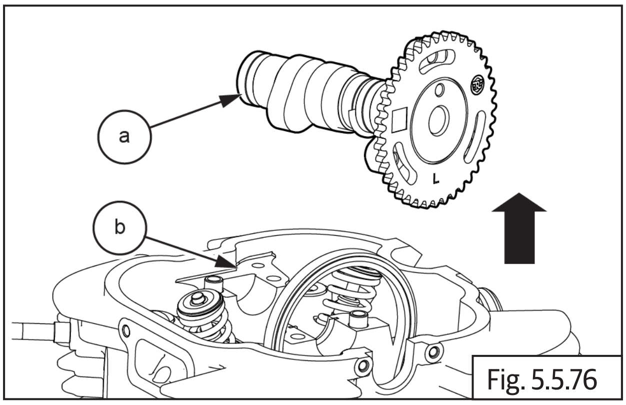


Fig. 5.5.76

- Remove "C" washer **(a)** from groove in cylinder head LH **(b)**.

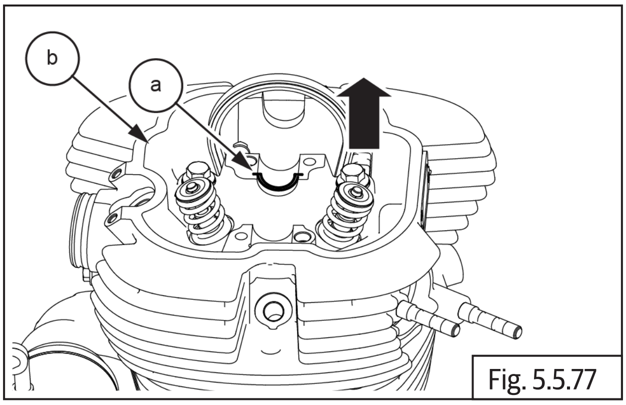


Fig. 5.5.77

🔧	Magnetic stick

- Support timing chain suitably at the top to prevent it from dropping into the crankcase.

5.5.30. Cover LH

- Remove 14 Nos. Hex socket head bolts **(M6) (a)** in crisscross pattern to remove cover LH **(b)**.

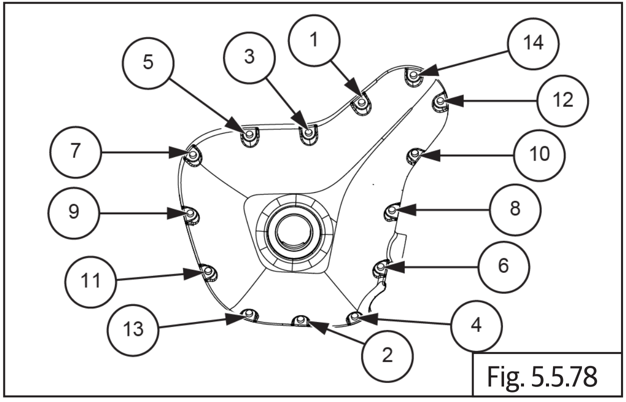


Fig. 5.5.78

🔧	5 mm Allen socket with Ratchet

- Remove the gasket **(a)** with the blunt tool

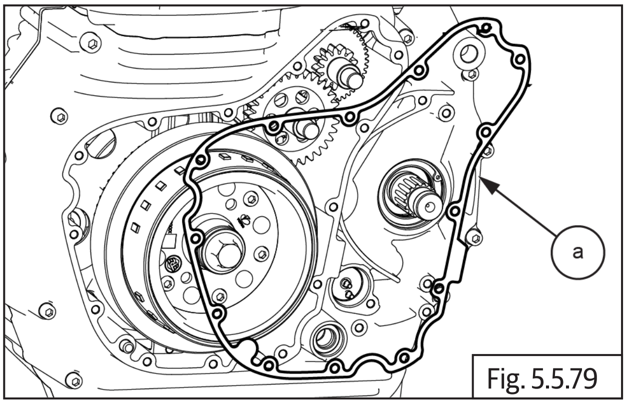


Fig. 5.5.79

⚠ CAUTION

Do not use a sharp tool to scrap the gasket material from the joint faces.

If required scrap only with a soft and blunt tool.

- Remove dowel pin **(a)** from the crankcase.

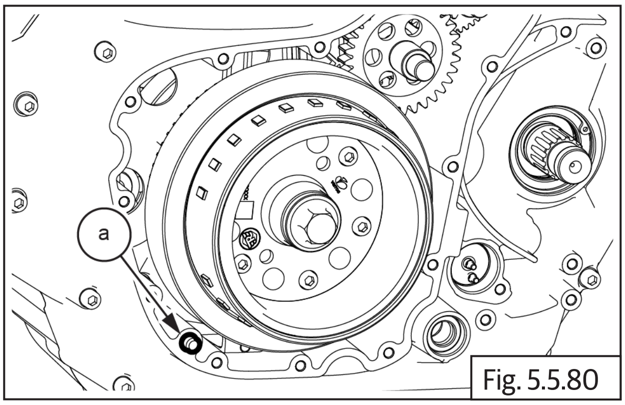


Fig. 5.5.80

5.5.31. Stator Assembly

Stator Assembly

- Remove 3 Nos. allen bolts **(M6) (a)** holding the stator assembly **(b)**.

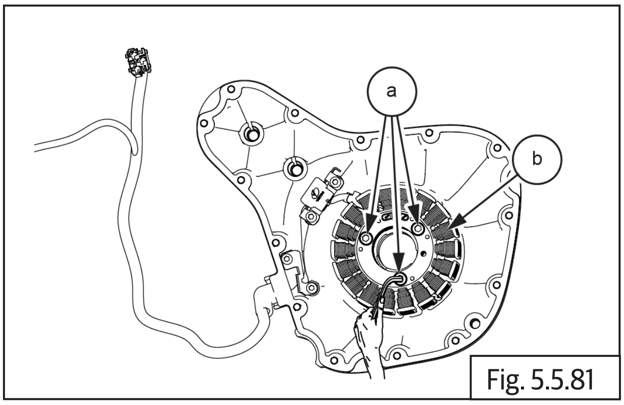


Fig. 5.5.81

🔧	5 mm Allen socket with Ratchet

Crank Position Sensor/Pickup Coil

- Remove 2 Nos. allen bolts **(a)** to release Pulsar coil.

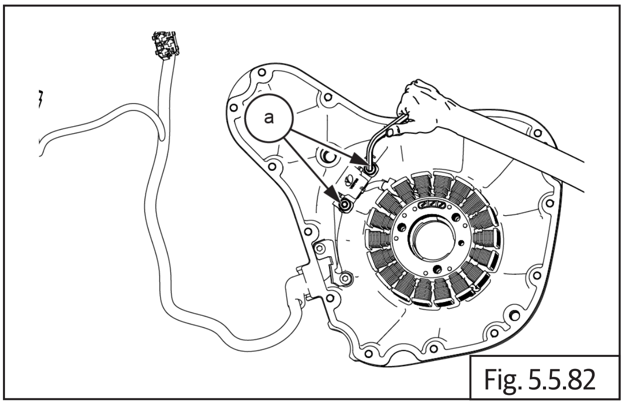


Fig. 5.5.82

🔧	4 mm Allen socket with Ratchet

- Remove 2 Nos. allen bolts **(M5) (a)** on guide plate.

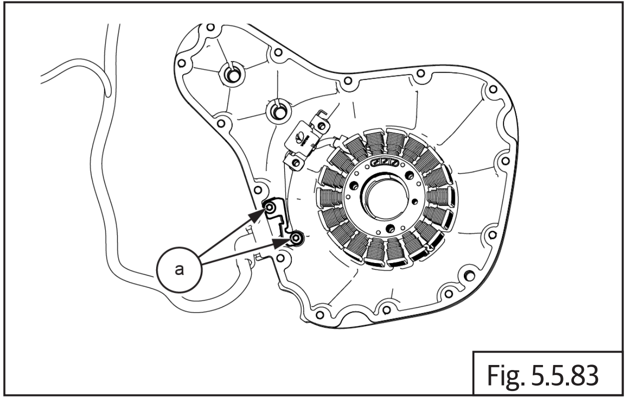


Fig. 5.5.83

🔧	4 mm Allen socket with Ratchet

- Gently remove stator assembly **(a)** from magneto cover.

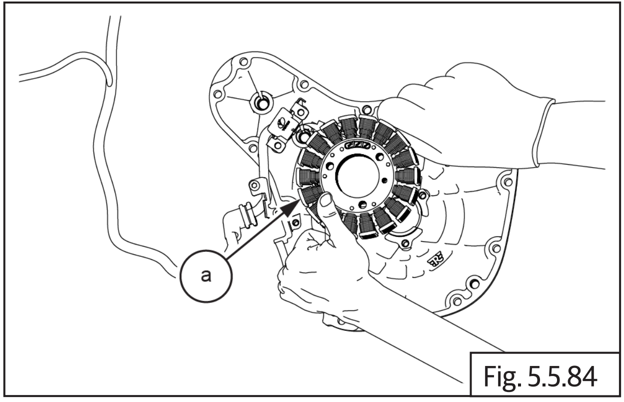


Fig. 5.5.84

5.5.32. Magneto Rotor Bolt

- In order to loosen magneto rotor bolt, it will be necessary to remove clutch cover Refer (Section 5.1.16).
- Insert special tool **(a)** in crankcase RH to lock the crankshaft.

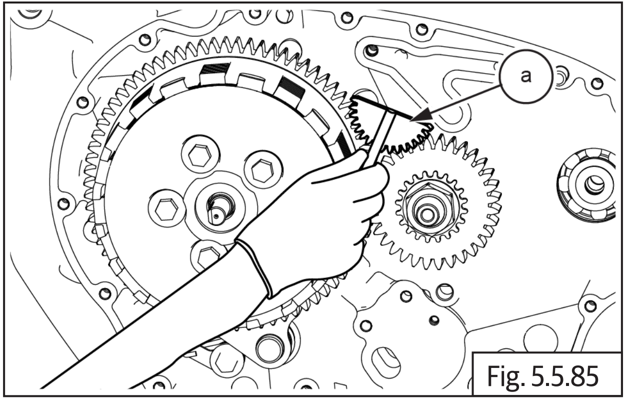


Fig. 5.5.85

SPL	Part No: ST-27533-2
	Part Name: Crank Gears locking tool

- Loosen and remove Hex flange head bolt **(M12) (a)**.

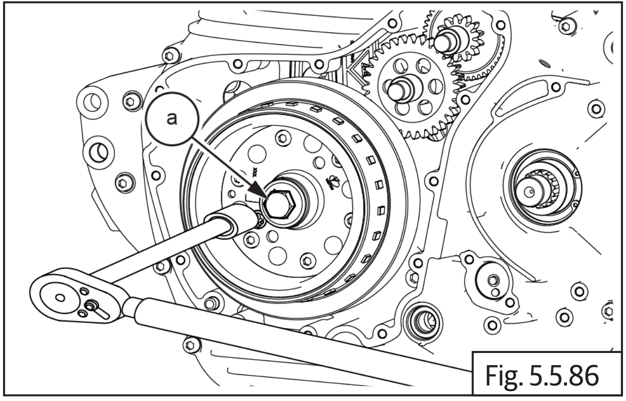


Fig. 5.5.86

🔧	17 mm Socket with Ratchet

- Assemble puller **(b)** on magneto rotor **(a)** and thread in fully.
- Tighten center bolt onto puller till magneto rotor gets released from crankshaft.

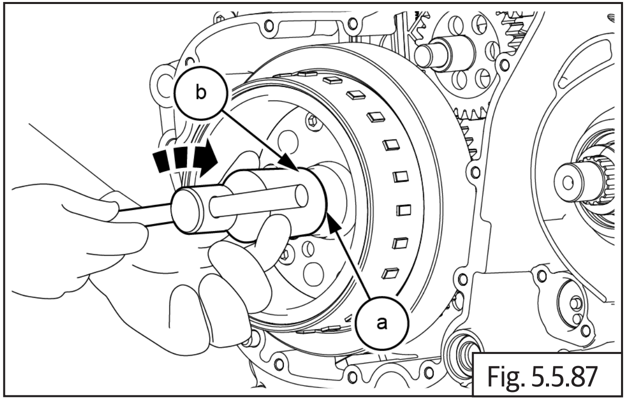
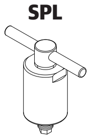


Fig. 5.5.87

SPL 	Part No: ST30274/a
	Part Name: Magneto Puller Assembly

- Gently pull out magneto rotor assembly **(a)** with starter clutch.

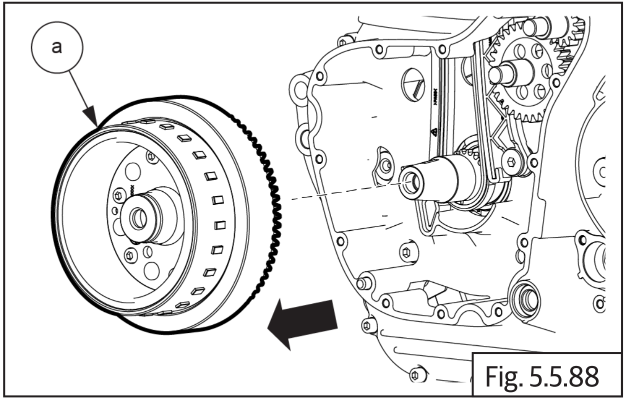


Fig. 5.5.88

- Remove woodruff key **(a)** from crankshaft.

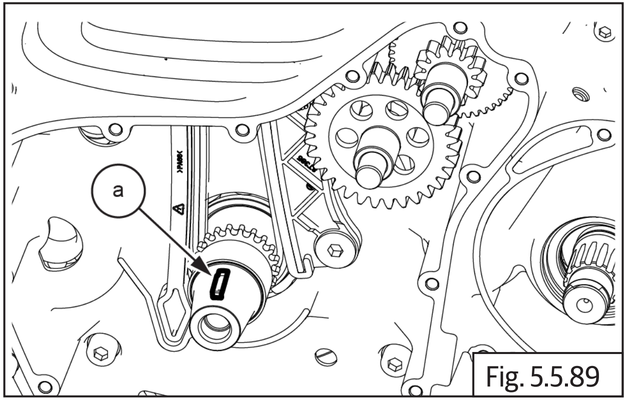


Fig. 5.5.89

🔧	Connector

5.5.33. Idler Gear

- Remove the 2 Nos. idle gear **(a)** and **(b)** with shaft-idler gear.

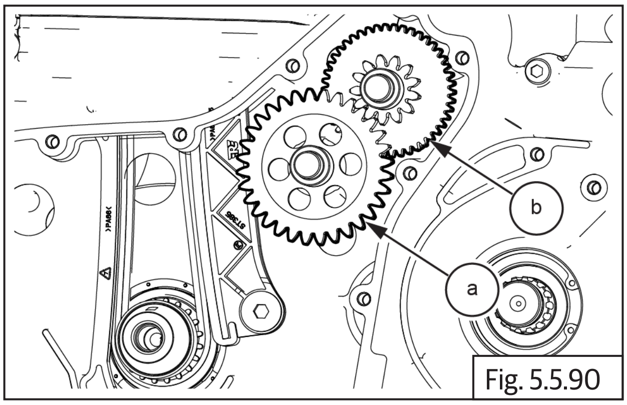


Fig. 5.5.90

5.5.34. Starter Clutch from Magneto Rotor

- Loosen 6 Nos. Hex socket head screws **(M6) (a)** from inside magneto rotor. **Do not LOOSEN AND REMOVE FULLY**.

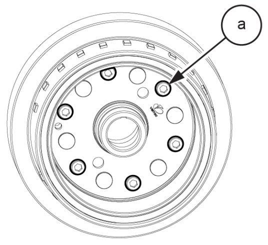


Fig. 5.5.91

🔧	5 mm Allen socket with Ratchet

- Remove magneto rotor assembly **(a)** from crank shaft, hold the rotor firmly, rotate gear starter clutch **(b)** anti-clockwise and pull out simultaneously to separate rotor from the gear.

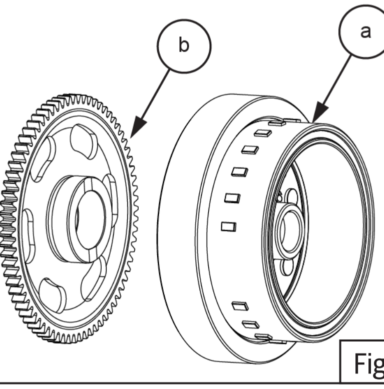


Fig. 5.5.92

- Remove starter clutch **(a)** from inside magneto rotor **(b)**

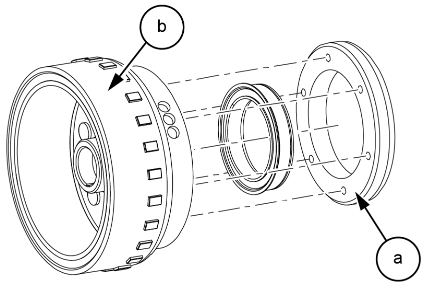


Fig. 5.5.93

5.5.35. Cylinder Head

⚠ CAUTION

M10 Cylinder bolts and washers are one time usage only. Always use new head bolts and washers during installation. Dispose old head bolts suitably.

- Loosen and remove 4 Nos. Hex head bolts **(M10) (a)** in crisscross pattern on cylinder head.

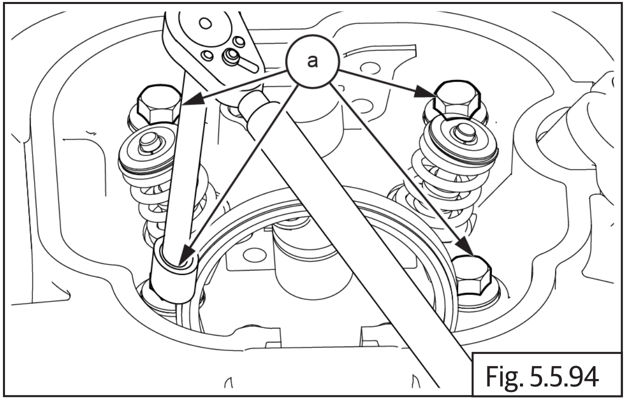


Fig. 5.5.94

🔧	12 mm Socket with Ratchet

- Loosen and remove 2 Nos. Hex head bolts **(M6) (a)** on cylinder head.

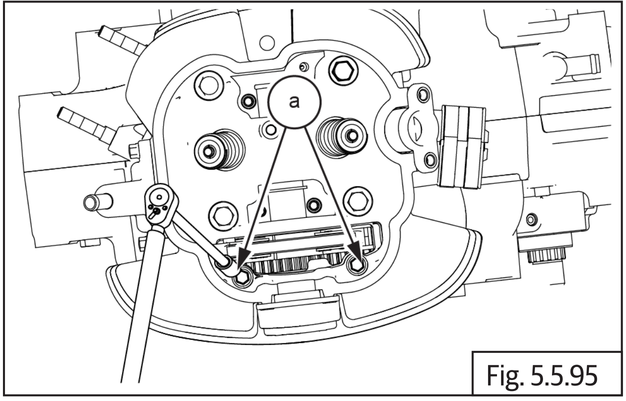


Fig. 5.5.95

🔧	8 mm Socket with Ratchet

- Support cam chain suitably and gently remove cylinder head **(a)** from cylinder barrel **(b).**

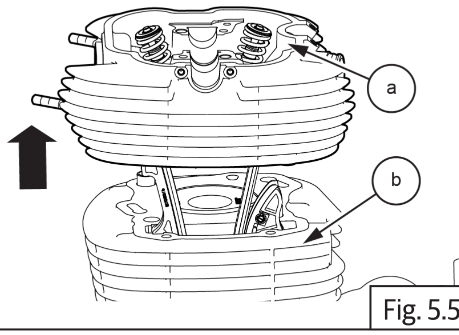
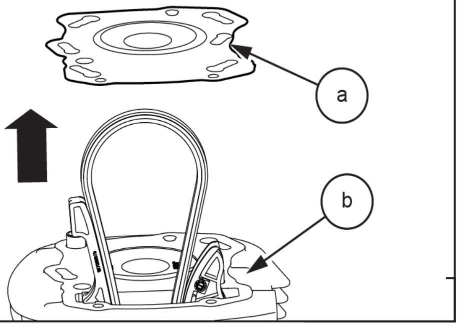


Fig. 5.5.96

- Remove the cylinder head gasket **(a)** from cylinder barrel **(b)**.



- Remove 2 nos dowel pins **(a)** on cylinder head.

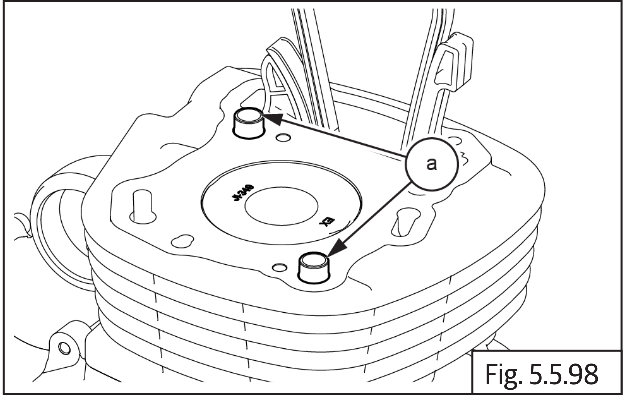


Fig. 5.5.98

	Nose Plier

5.5.36. Components from Cylinder Head

Valves and Springs

- Compress valve spring **(a)** with valve spring compressor **(b)**.

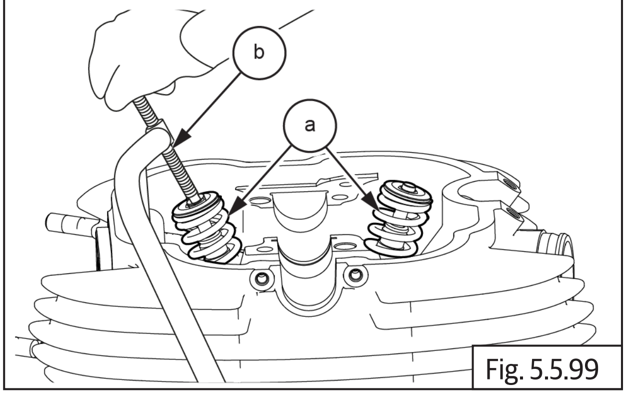
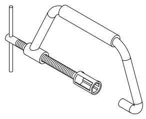


Fig. 5.5.99

SPL 	Part No: ST-27528-2
	Part Name: Valve spring compressor

- Remove the cotters **(a)** on valve stem at the top.

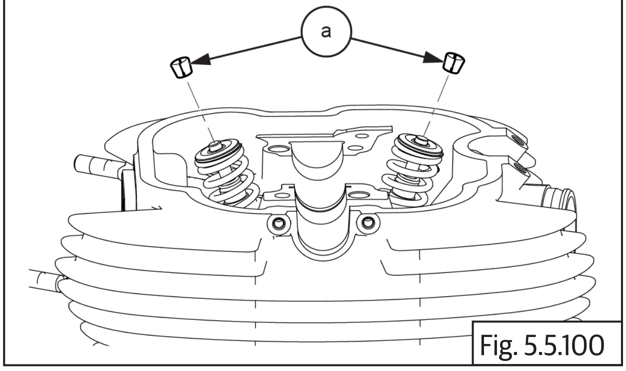


Fig. 5.5.100

- Gently loosen the screw on valve spring compressor, till the valve spring tension is completely released and remove the special tool.

⚠ CAUTION

Valve spring under high tension when compressed .

Release valve spring compressor tool slowly.

- Remove the retainer, valve spring **(a)** from the top of the valve spring **(b)**.

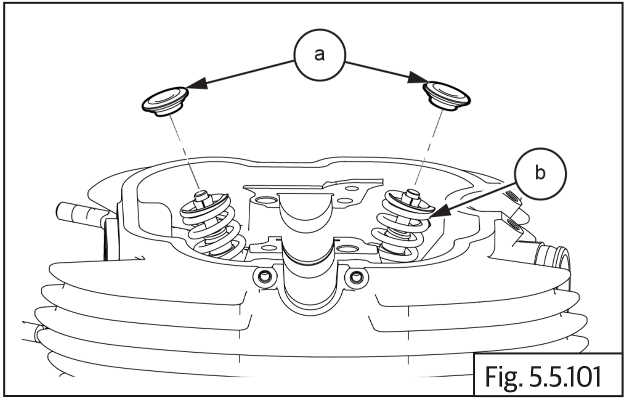


Fig. 5.5.101

- Remove valve spring **(a)** from valve stem **(b)**.

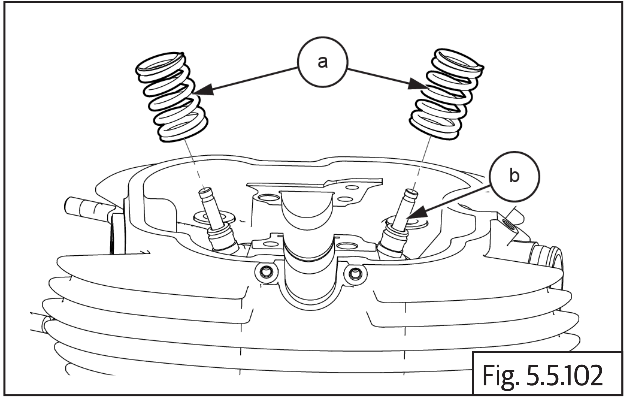


Fig. 5.5.102

NOTE
• Mark the position of the spring before removing

- Remove valve **(a)** from cylinder head **(b)** by pulling it out from the cylinder head inside.

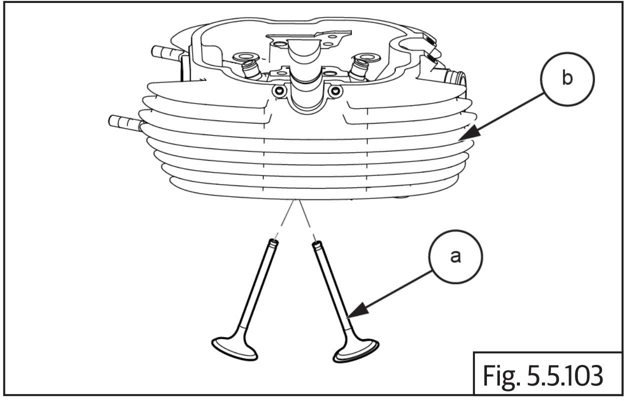


Fig. 5.5.103

- Remove valve stem seal **(a)** from valve guide **(b)**.

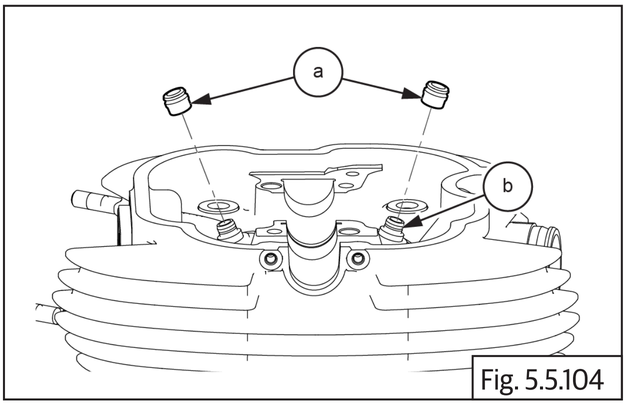


Fig. 5.5.104

🔧	Nose Plier

5.5.37. Guide pad - Cam chain

- Remove guide pad - cam chain **(a)** and **(b)** from cylinder barrel.

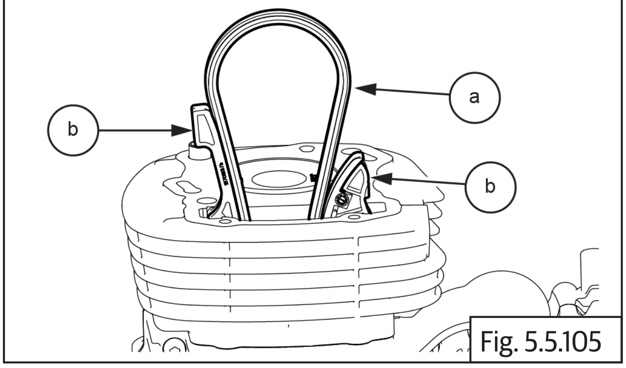


Fig. 5.5.105

5.5.38. Cylinder Barrel

- Slightly tilt and gently remove the cylinder barrel **(a)** from crankcase **(b)**.

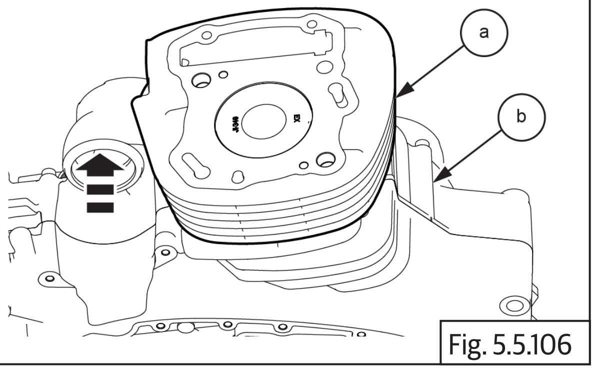


Fig. 5.5.106

- Remove 2 nos dowel pin **(a)** from cylinder barrel

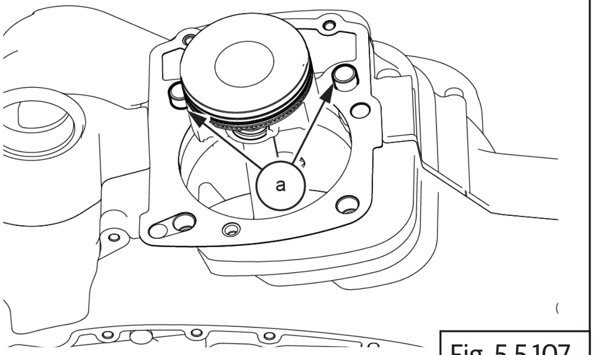


Fig. 5.5.107

🔧	Nose Plier

5.5.39. Piston

⚠ CAUTION

Cover the crankcase opening below the piston with a cloth to avoid circlip falling into the crankcase.

- Remove the circlip **(a)** from piston.

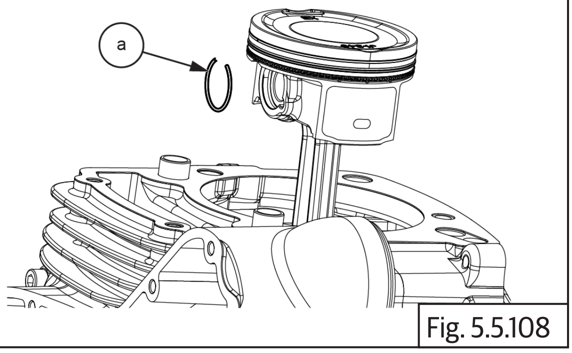


Fig. 5.5.108

🔧	Screw driver

- Gently push out the gudgeon pin **(a)** to release the piston **(b)**.

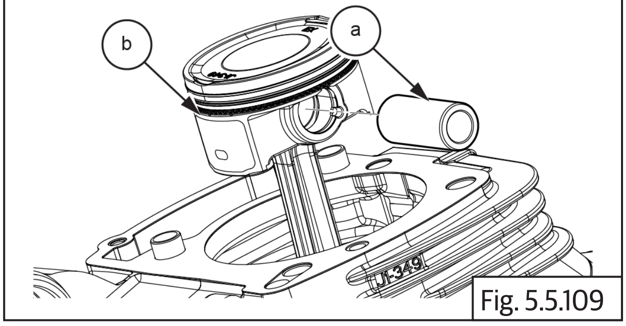


Fig. 5.5.109

5.5.40. Crankcase Fasteners

Description	Quantity
M8	4
M6 x 1.25 x 35	16

- Support crankcase assembly on suitable wedges such that the fasteners on the crankcase can be removed.

- Slackening sequence.

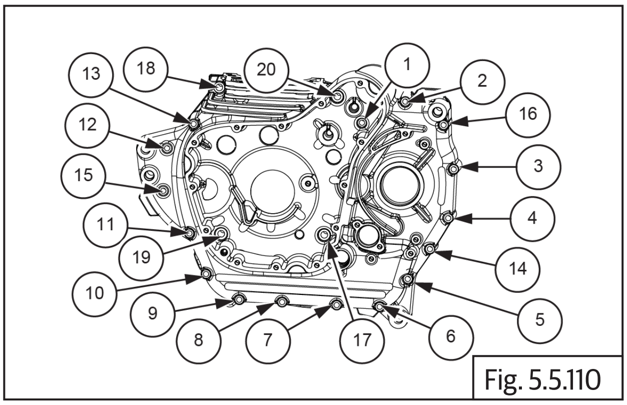


Fig. 5.5.110

5.5.41. Splitting Crankcase

- Ensure the crankcase is supported firmly on suitable wedges.
- Gently separate the LH crankcase from the RH crankcase by slightly tapping on the tabs (a) provided in LH crankcase, to release from the dowels and sealing gasket material.

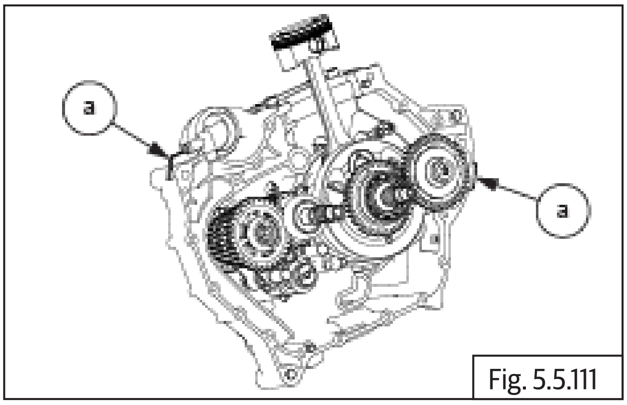


Fig. 5.5.111

- Remove RH crankcase along with the gear selector drum, from the upper crankcase.
- Remove 2 Nos dowel pins **(a)** from crankcase.

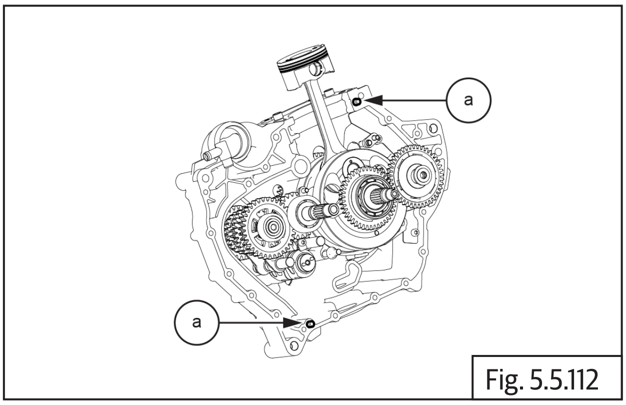


Fig. 5.5.112

🔧	Nose plier

⚠ CAUTION

Ensure all the mounting fasteners on the crankcase have been removed.

Ensure the gear shift forks are not jammed in the grooves in the gears.

Ensure the dowels are removed from the LH and RH crankcases.

5.5.42. Balancer Shaft

- Match the punch mark **(a)** in balancer shaft and crankshaft.

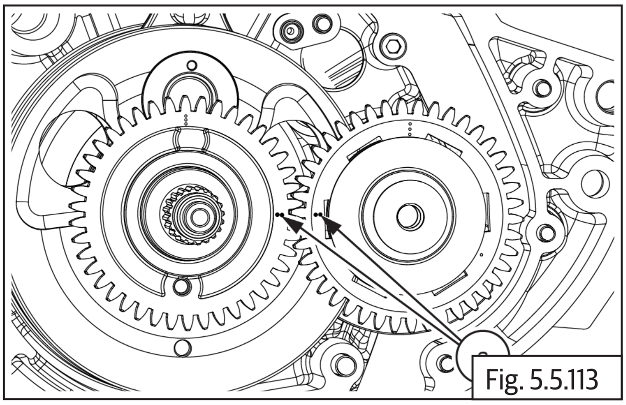


Fig. 5.5.113

- Remove balancer shaft **(a)**.

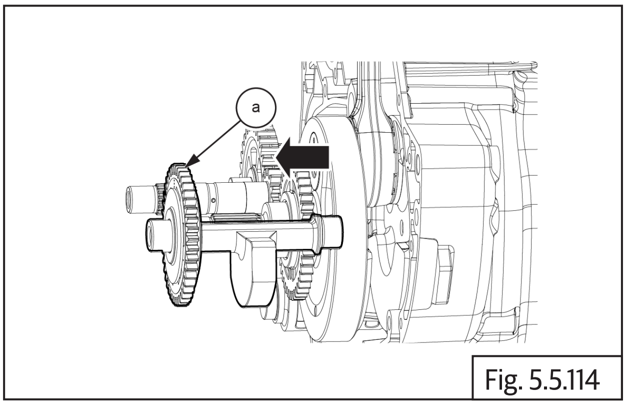


Fig. 5.5.114

- Mark the location of spring and pin before dismantling.

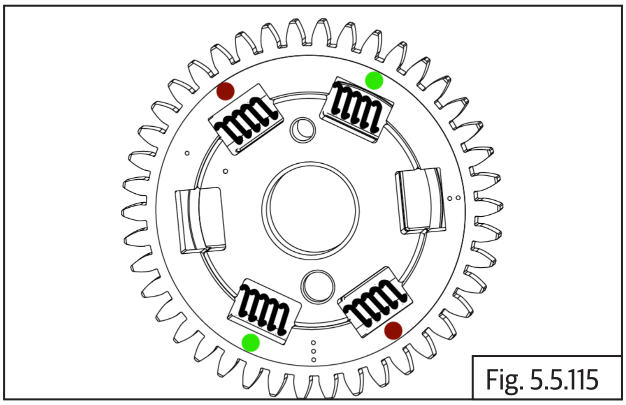


Fig. 5.5.115

- Green - Springs only
  Red - Springs with Pin
- Remove balancer shaft cush **(a)** drive by gently pushing it oustide.

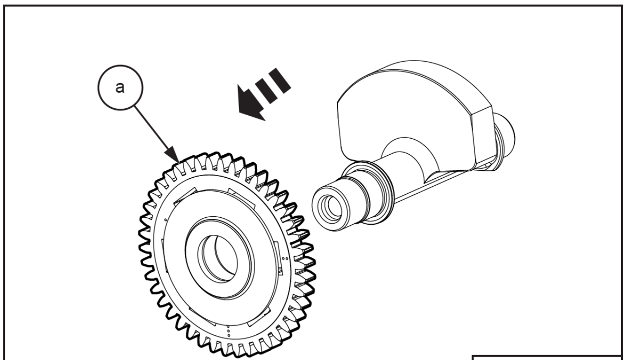


Fig. 5.5.116

- Gently remove springs **(a)** and pins **(b)** and store it in a container.

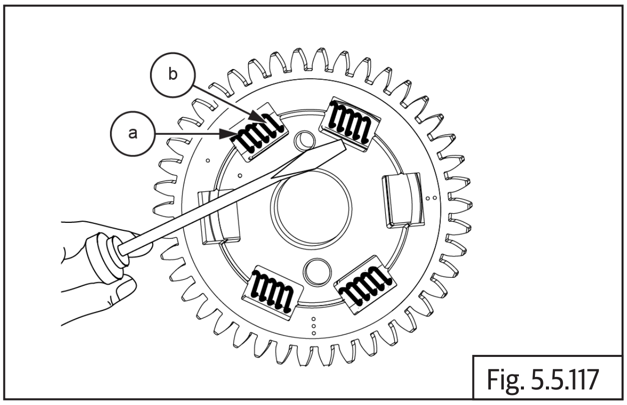


Fig. 5.5.117

5.5.43. Crankshaft Assembly

⚠ CAUTION

Crankcase bolts are one time use only.

Bolts are non reusable

- Gently lift and remove crankshaft assembly **(a)** from crankcase.
- Use a mallet if required.

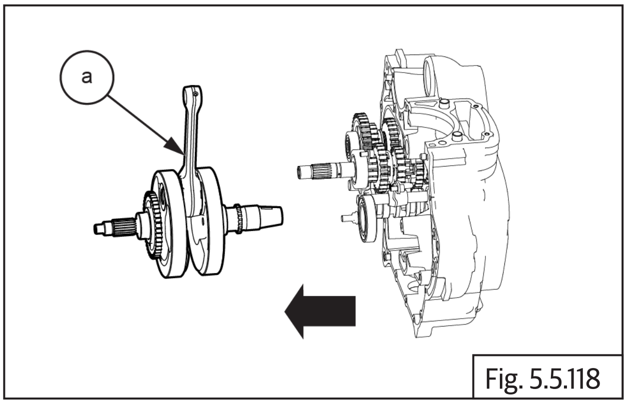


Fig. 5.5.118

5.5.44. Gear Selector

- Gently pull to remove transmission selector drum **(a)** with selector forks **(b)** and spindles **(c)**.

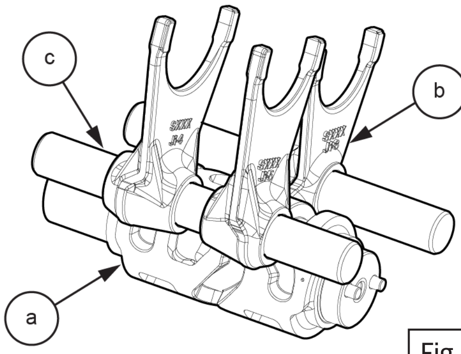
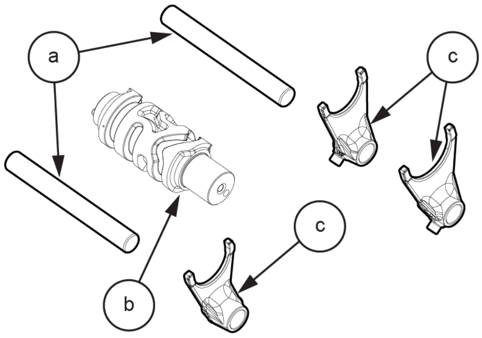


Fig. 5.5.119

- Remove spindle **(a)** from forks **(c)** from selector drum **(b)**.



5.5.45. Countershaft

- Place countershaft seperately.

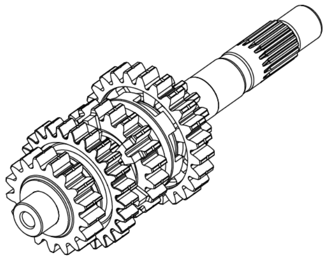
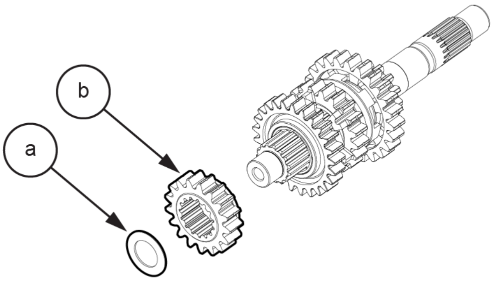
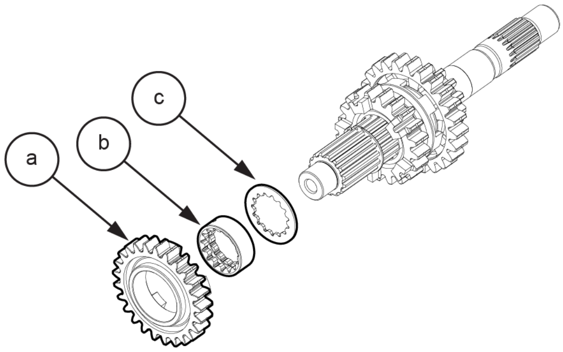


Fig. 5.5.121

- Remove thrust washer **(a)** and second drive gear **(b)** from the countershaft smaller end.



- Remove fourth drive gear **(a)** along with splined bush **(b)** and splined washer **(c)** from countershaft



- Remove the circlip **(a)** from the countershaft.

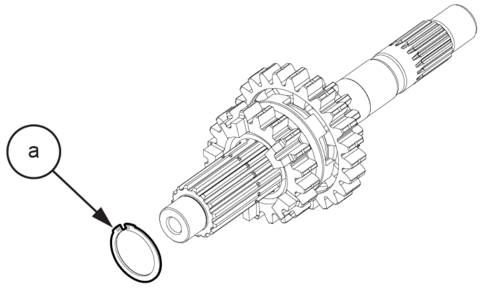


Fig. 5.5.124

Circlip Expander

- Remove the third drive gear **(a)** from the countershaft.

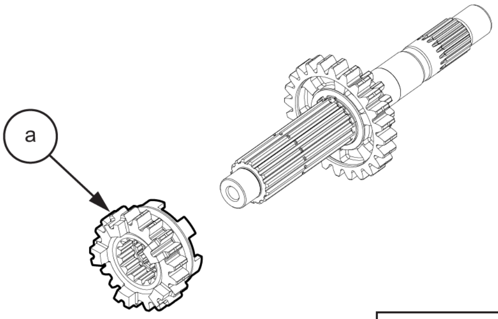


Fig. 5.5.125

- Remove circlip **(a)** from the countershaft.

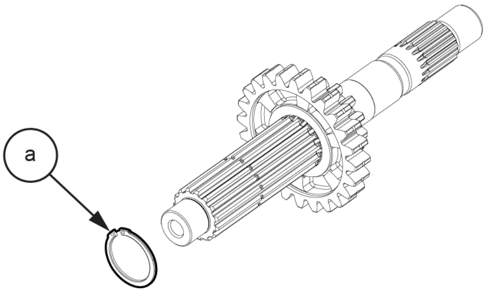


Fig. 5.5.126

Circlip Expander

- Remove the washer **(a)** along with gear **(b)** and bush **(c)** from countershaft.

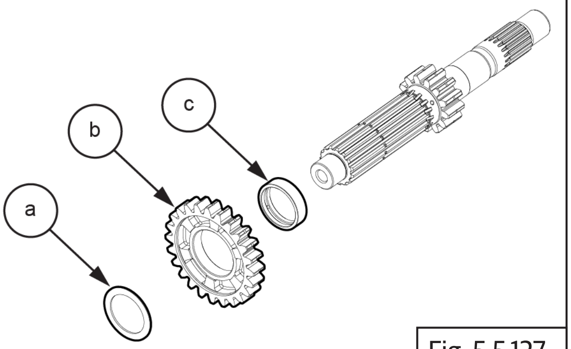
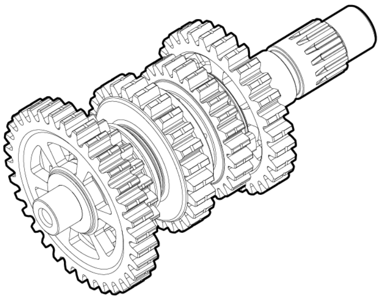


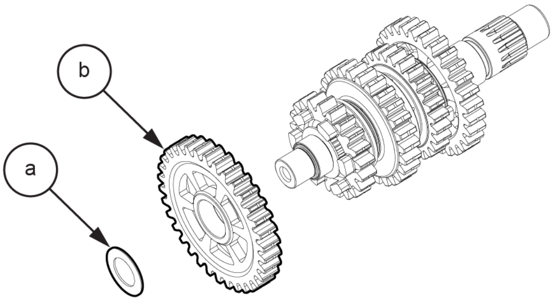
Fig. 5.5.127

5.5.46. Driveshaft

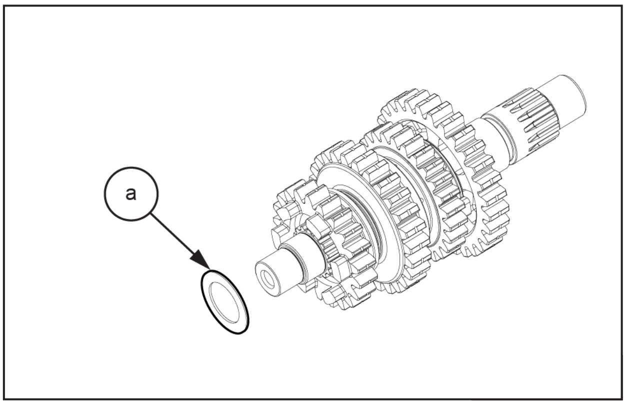
- Place the drive shaft seperately.



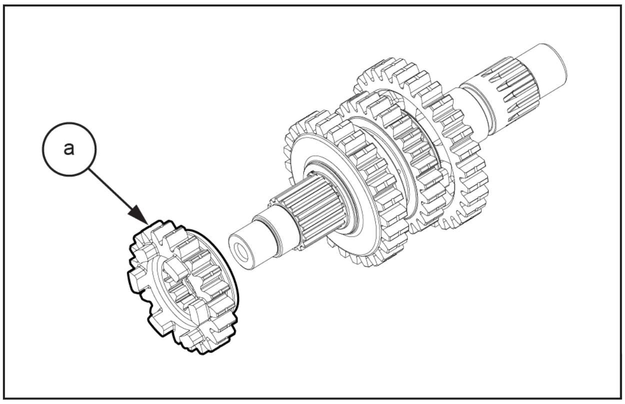
- Remove thrust washer **(a)** and first driven gear **(b)** from driveshaft.



- Remove thrust washer **(a)** from driveshaft.



- Remove fifth driven gear **(a)** from the driveshaft.



- Remove circlip **(a)** from driveshaft.

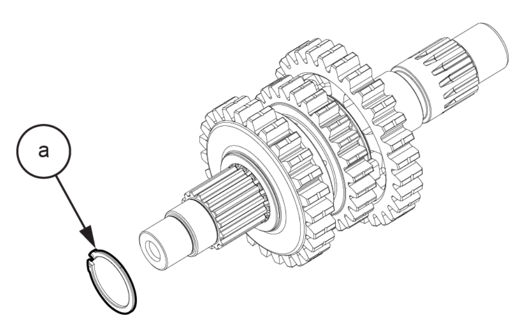
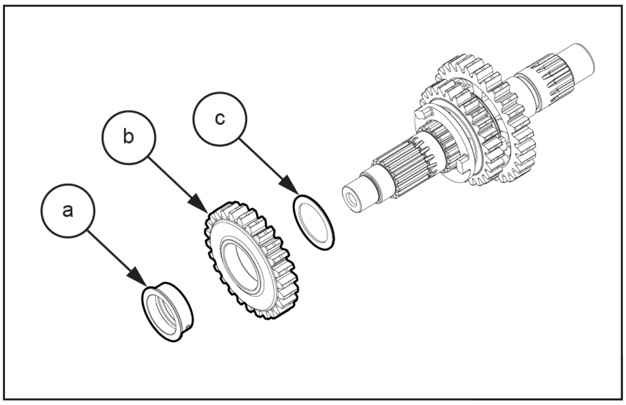


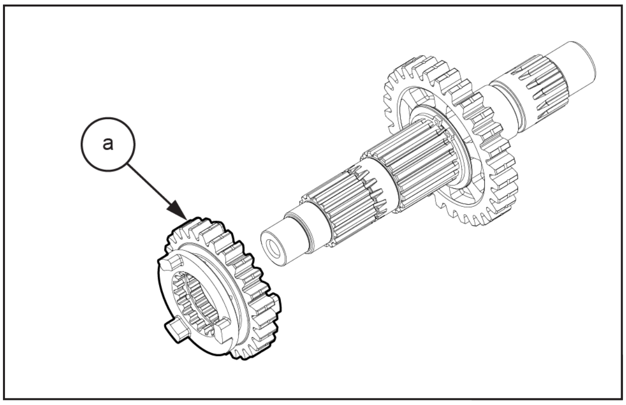
Fig. 5.5.132

	Circlip Expander

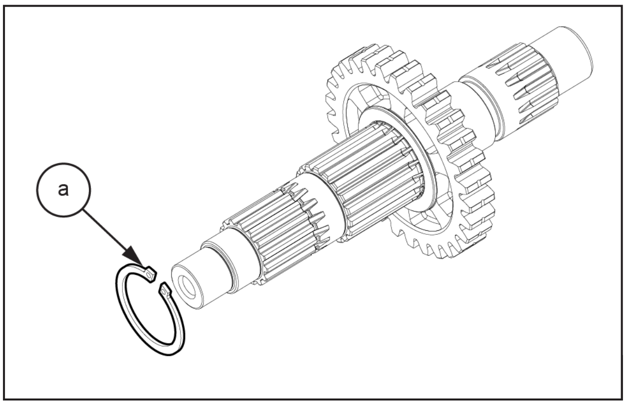
- Remove bush **(a)** along with 3rd driven gear **(b)** and thrust washer **(c)** from driveshaft.



- Remove fourth driven gear **(a)** from the driveshaft.



- Remove circlip **(a)** from groove in the driveshaft.



	Circlip Expander

- Remove bush **(c)** along with second driven gear **(b)** and thrust washer **(a)** from driveshaft.

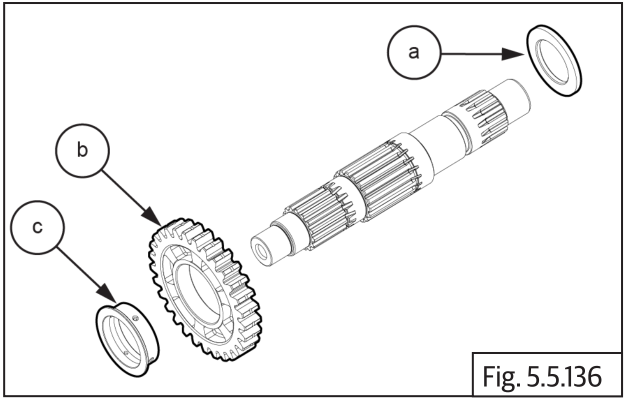


Fig. 5.5.136

ENGINE INSPECTION

Engine Inspection

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5.6.6 Selector Drum 130

5.6 Engine Inspection

NOTE

- *Remove off carbon deposits by scraping gently.*
- *Use soft blunt objects to clean.*
- *Wash components with recommended solvents.*
- *Ensure area is clean and dry before inspection.*

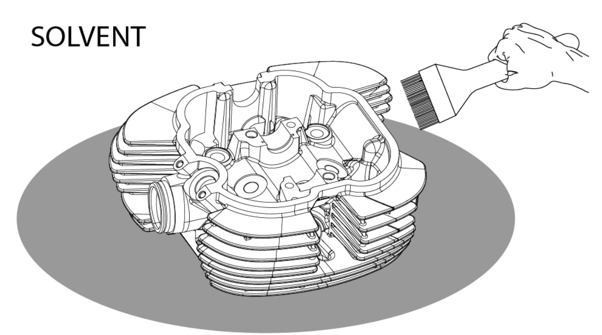

Fig. 5.6.1

5.6.1 Cylinder Head

Cylinder Head Inspection

- Inspect cylinder head carefully for any cracks, blow holes or damages – especially in the inlet and exhaust ports.
- Place thick straight edge across cylinder head gasket seating surface.
- Insert pointed feeler gauge of 0.05 mm thickness between straight edge and cylinder head.
- Inspect and ensure 4 locations **(a, b, c, d)** on cylinder head are at same level.

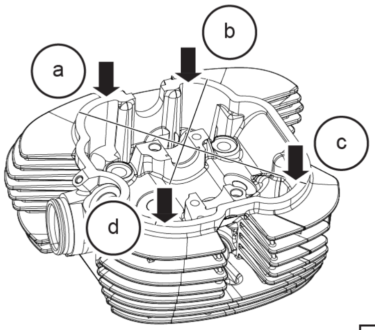

Fig. 5.6.2

- Ensure feeler enters properly at marked places.

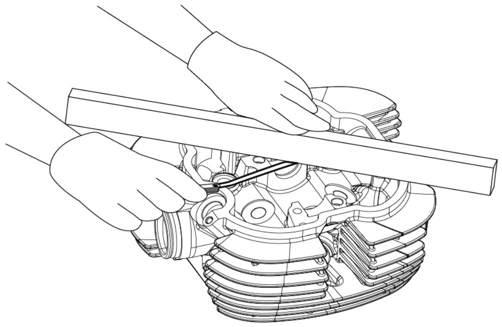

Fig. 5.6.3

🔧	Thick straight edge and Feeler gauge

Service limit:	0.05 mm

Rocker Cover to Cylinder Head Seating Surface

- Place the thick straight edge across the rocker cover gasket seating surface.
- Insert pointed feeler gauge of 0.05 mm thickness between straight edge and cylinder head at the marked places.

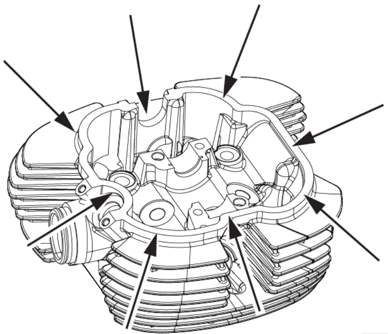

Fig. 5.6.4

- Ensure feeler enters properly at marked places.

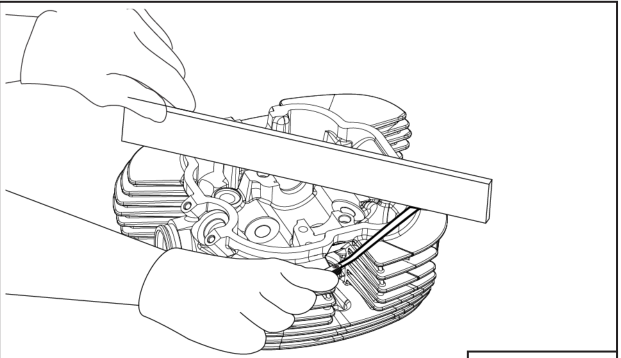

Fig. 5.6.5

	Thick straight edge and Feeler gauge

Service limit:	0.01 mm

Rocker Cover

- Place thick straight edge across the rocker cover.
- Insert pointed feeler gauge of 0.05 mm thickness between straight edge and rocker cover.
- Inspect and ensure 4 locations **(a, b, c, d)** on rocker cover are at same level.

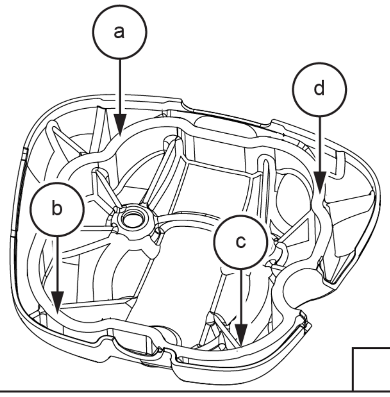

Fig. 5.6.6

	Thick straight edge and Feeler gauge

Service limit:	0.05 mm

Camshaft Journal OD

- Measure camshaft journal OD **(a)**.

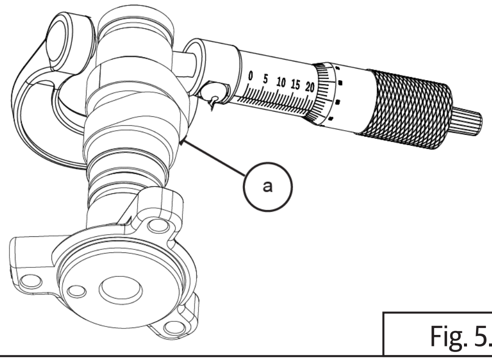

Fig. 5.6.7

	Micrometer

Service Limit:	23.930 mm

Camshaft Lobe

- Inspect cam lobes for scoring, wear-out and scratches.
- Measure height of each cam lobe **(a)**.

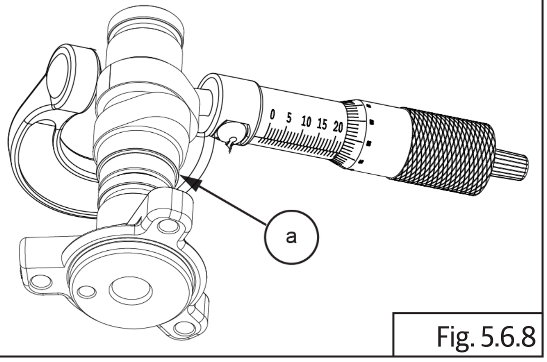

Fig. 5.6.8

	Micrometer

Service limit (Intake):	35.460 mm
Service limit (Exhaust):	34.930 mm

Valve Inspection.

- Check each valve for wear, burn or distortion at its face and stem end. Replace valve, if necessary.
- Check valve stem end face for pitting and wear.
- When it is worn out, replace the valve.

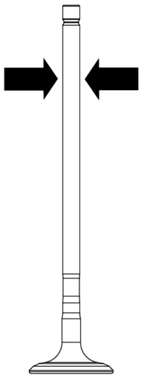

Fig. 5.6.9

Valve Guide ID (Inlet and Exhaust)

- Using micrometer and bore gauge, measure the ID of the valve guides at the top and bottom working area inside the guides.

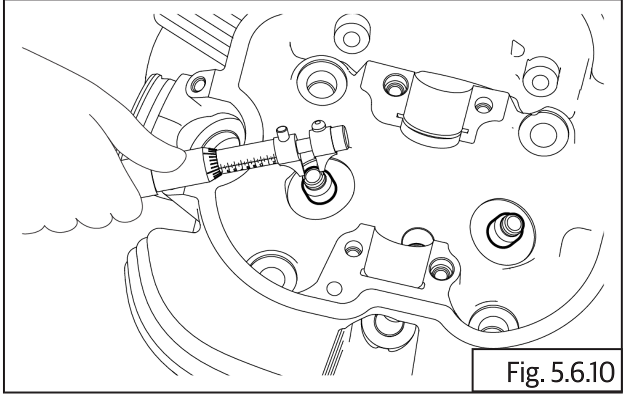

Fig. 5.6.10

🔧	Micrometer and Bore gauge

Service Limit Intake	6.070 mm
Service Limit Exhaust:	6.100 mm

Valve Spring (Inlet and Exhaust)

- Measure load on installed and working condition.

Installed Load	
Minimum:	154.100 N-m
Maximum:	174.100 N-m

Working Load	
Minimum:	431.300 N-m
Maximum:	461.300 N-m

Valve Stem OD (Inlet and Exhaust Valve)

- Measure diameter at marked places along the length of each stem.

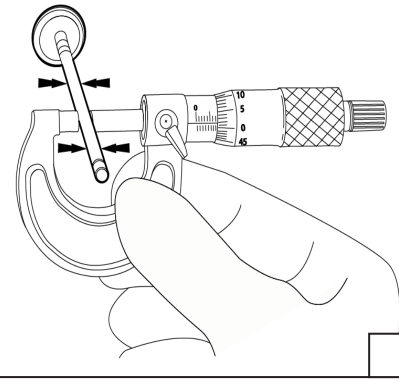

Fig. 5.6.11

🔧	Micrometer

Inlet Valve Stem	
Measuring Point	**Service Limit**
Stem OD Top	5.945 mm
Stem OD middle	5.945 mm
Stem OD bottom	5.945 mm
Bend	0.010 mm

Exhaust Valve Stem	
Measuring Point	**Service Limit**
Stem OD Top	5.920 mm
Stem OD middle	5.920 mm
Stem OD bottom	5.920 mm
Bend	0.010 mm

5.6.2 Cylinder Barrel

Cylinder Barrel Bore ID

- Check cylinder bore to piston working area for scoring, seizure marks and/or excessive wear.
- Measure the cylinder bore at the top, middle and bottom at the rings working area using a bore gauge.
- Measure at both across and along the gudgeon pin axis.

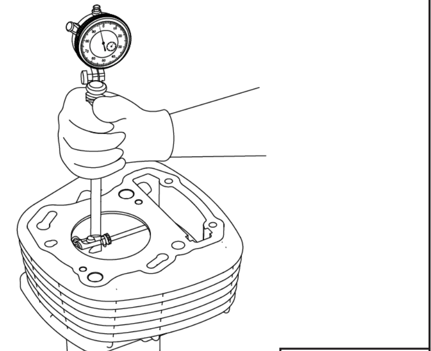

Fig. 5.6.12

🔧	Bore gauge

Measuring points	Service Limit
(ID) Top of Piston working area	72.09 mm
Top of Piston working area	72.09 mm
(ID) Middle of Piston working area	72.09 mm
(ID) Bottom of Piston working area	72.09 mm
Bottom of Piston working area	72.09 mm
Barrel Bore Service Limit	72.09 mm

Service Limit	72.09

Piston OD

- Measure and record both LH and RH cylinder piston OD at three levels - Top, Middle, and Bottom using Micrometer.

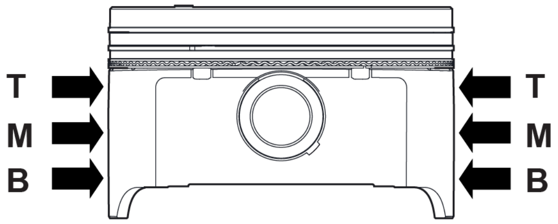

Fig. 5.6.13

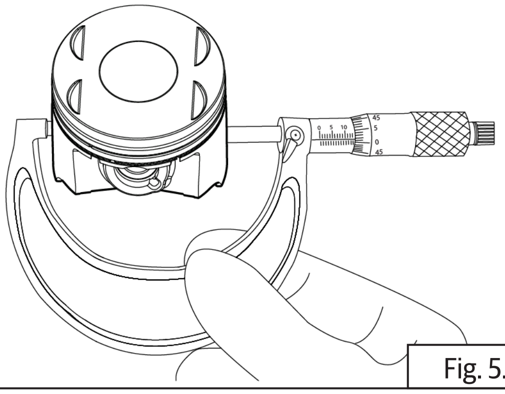

Fig. 5.6.14

🔧	Micrometer

Service Limit	71.895 mm

Piston Pin Bore ID

- Measure both LH and RH cylinder piston pin bore **(a)** inner diameter using inside micrometer **(b)**.

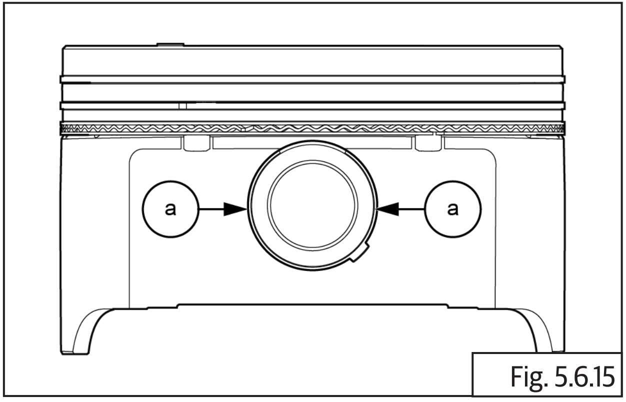

Fig. 5.6.15

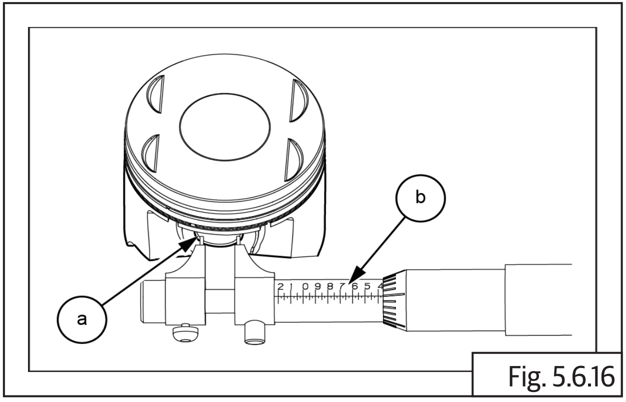

Fig. 5.6.16

	Inside micrometer

Service Limit	19.997 mm

Piston Ring End Gap

- Position the piston rings at their respective locations at the top of the cylinder barrel and ensure they are seated “squarely” inside the cylinder barrel.

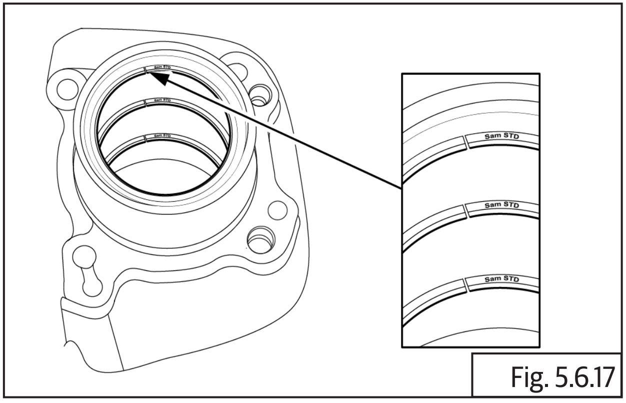

Fig. 5.6.17

- Measure piston rings end gap **(a)** using feeler gauge **(b)**.

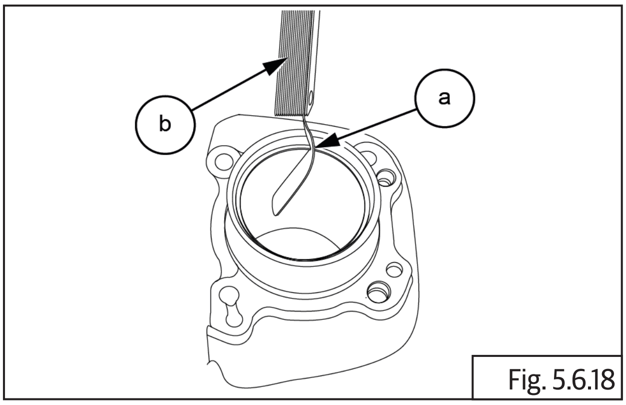

Fig. 5.6.18

	Feeler gauge

Measuring Points	Service Limit
Piston ring top 1	0.6mm
Piston ring top 2	0.7 mm

5.6.3 Crankcase

Connecting Rod Small End ID

- Measure the connecting rod small end inner diameter **(a)**.

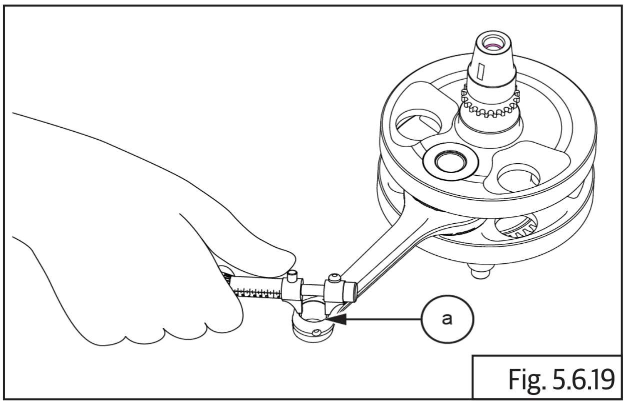

Fig. 5.6.19

	Inside Micrometer

Service Limit	20.042 mm

	V-Blocks and Dial gauge.

5.6.4 Clutch Components

Friction plate

- Inspect the clutch plates visually for uneven wear, seizure and discoloration.
- Measure the thickness of the friction plate **(a)** at 4 locations marked by arrows.

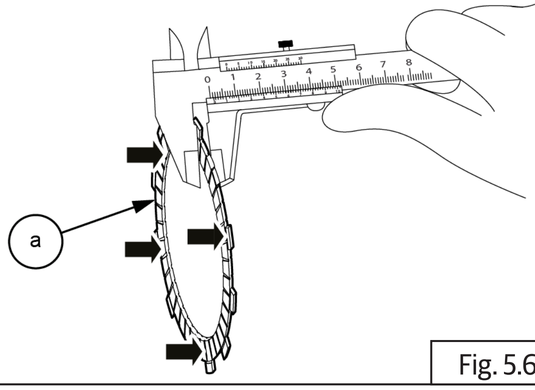

Fig. 5.6.20

🔧	Vernier caliper

Service Limit:	2.80 mm
Bend	0.3 mm

Steel Plate

- Measure the thickness of the steel plates **(a)** at different locations.

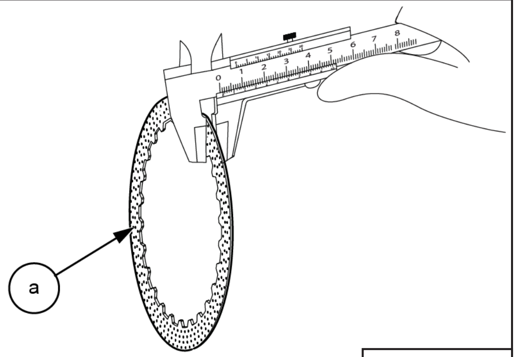

Fig. 5.6.21

🔧	Vernier caliper

Service Limit:	1.50 mm
Bend	0.3 mm

Spring

- Measure the length of the spring in decompressed condition using a vernier caliper..

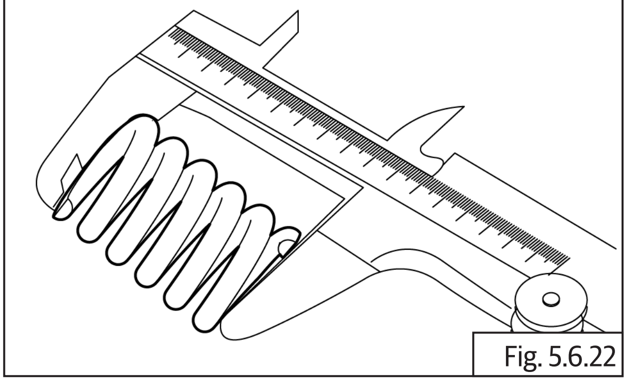

Fig. 5.6.22

🔧	Vernier Caliper

Service Limit:	44.30 mm

Clutch Hub Washer

- Measure width of the washer using a micrometer.
- Make sure the washer is free of dents and burrs. Replace if found damaged.

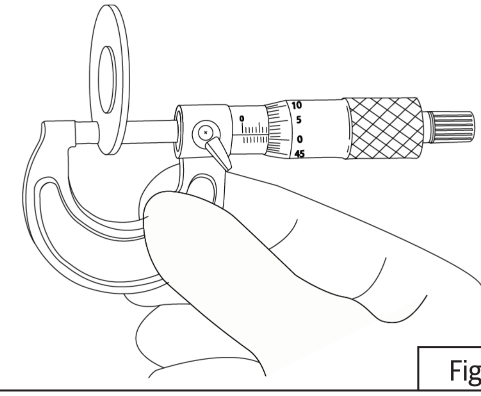

Fig. 5.6.23

🔧	Micrometer

Service Limit:	1.95 mm

Center Clutch

- Inspect the clutch hub for any scratches, abnormal wear or damage of the lugs.

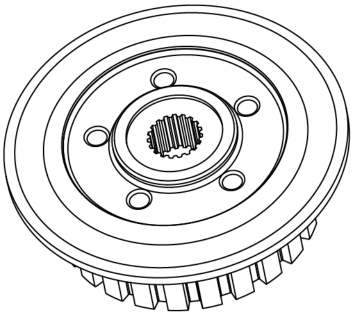

Fig. 5.6.24

- Visually inspect outer component clutch center for any scratches, wear or damage.

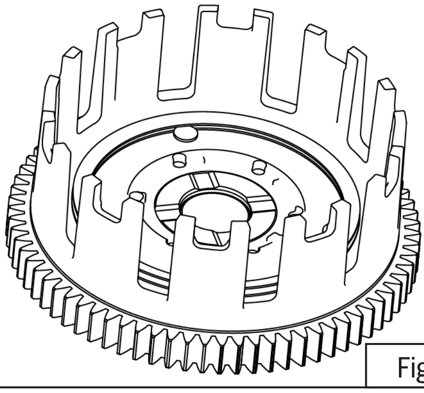

Fig. 5.6.25

Pressure Plate

- Visually inspect pressure plate for any, wear, bends, lug breakage, heat marks or damages.

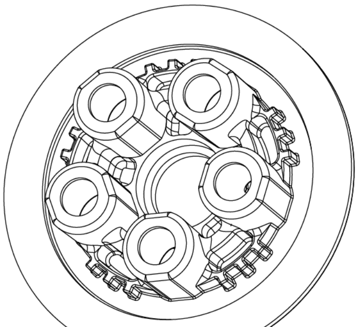

Fig. 5.6.26

5.6.5 Shifter Forks

- Measure the pegs on shifter forks **(a)** using micrometer for wear.

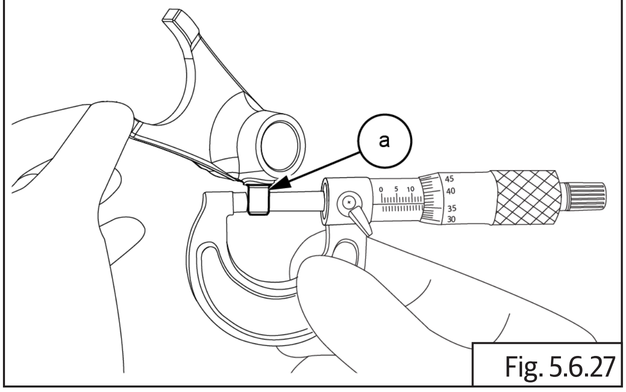

Fig. 5.6.27

🔧	Micrometer

Service Limit:	7.80 mm

- Visually inspect the shifter fork machined lugs **(a)** for damage, excessive wear out scoring and replace if damaged.

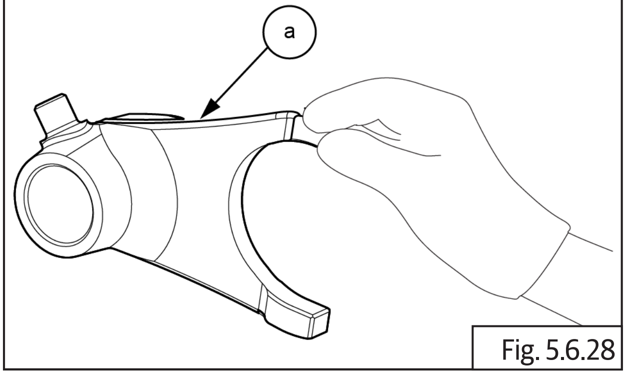

Fig. 5.6.28

5.6.6 Selector Drum

- Inspect the shifter fork working grooves in the selector drum for any damages, chipped ends etc. Measure the grooves in their working area for excessive wear out.

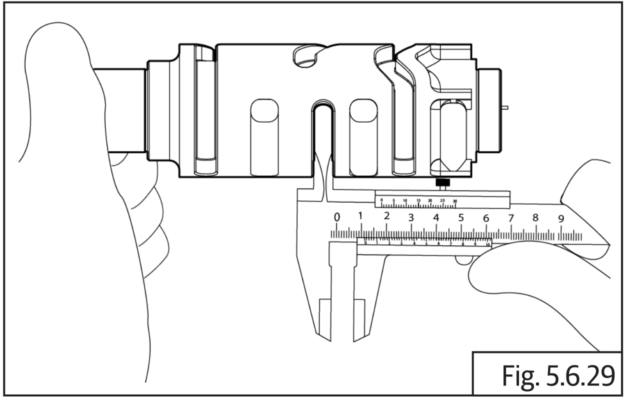

Fig. 5.6.29

🔧	Vernier caliper

Service Limit:	7.90 mm

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ENGINE ASSEMBLY

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5.8 Engine Assembly

5.8.1. Components Sub Assembly in Crankcase

5.8.2. Crankshaft Assembly

NOTE

- *Lubricate crankshaft big end bearing with engine oil before installation*

- Gently install crankshaft assembly (a) on LH crankcase.

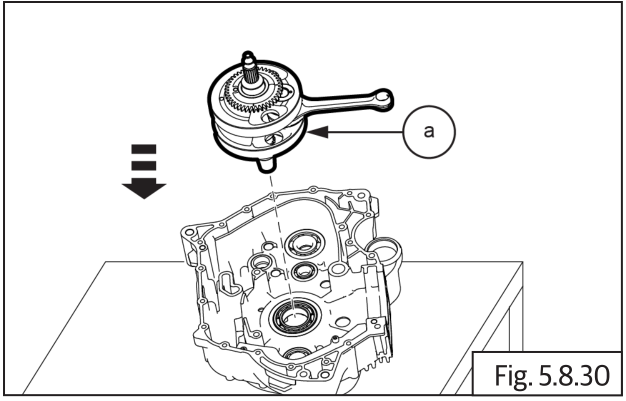


Fig. 5.8.30

5.8.3. Balancer Shaft

- Locate and asssemble pins **(a)** along with springs **(b)** in the marked location.
- Green - Springs only
  Red - Springs with Pin

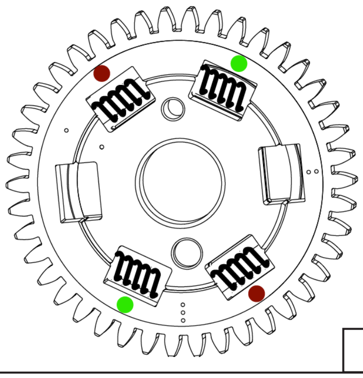


Fig. 5.8.31

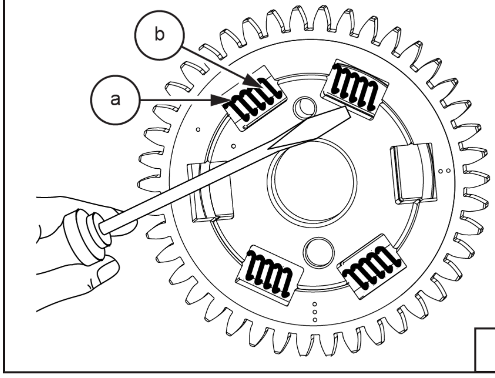


Fig. 5.8.32

- Align dot mark in gear and balancer shaft.

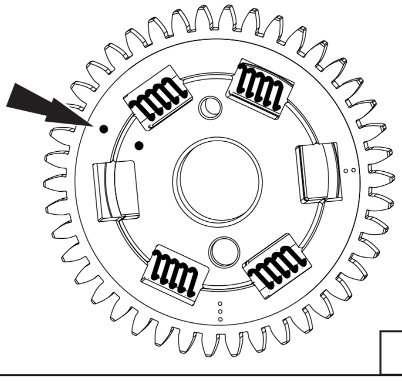


Fig. 5.8.33

- Assemble cush drive gear **(a)** on balancer shaft.

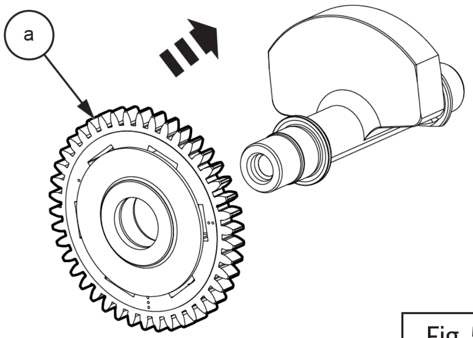


Fig. 5.8.34

- Install balancer shaft **(a)** on the LH crankcase .

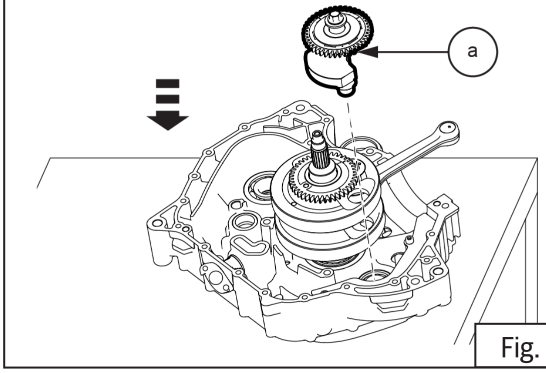


Fig. 5.8.35

- Ensure that three punch mark **(a)** on the crankshaft gear and balancer shaft are matching.
- Ensure both the gears are meshed correctly.

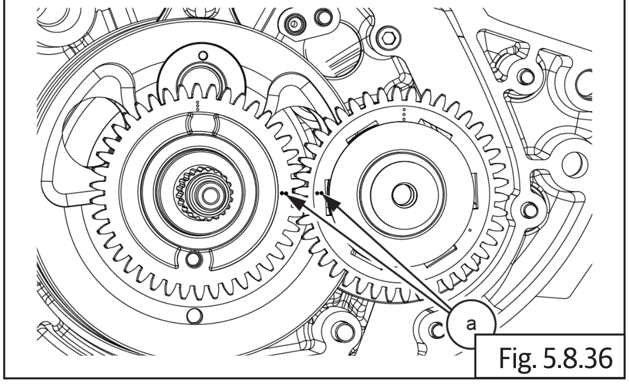


Fig. 5.8.36

5.8.4. Countershaft Components

NOTE
- *Do not reuse thrust washers, circlips, collar bush.* - *Ensure all components are cleaned and lubricated with recommended lubricants before assembly* - *Apply engine oil on gears before installation.*

- Install bush **(a)** on countershaft.
- Install 5th drive gear **(b)** with slot side of gear facing outside over the bush and install washer **(c)**.

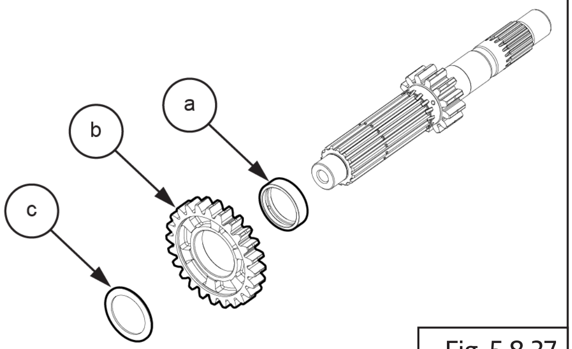


Fig. 5.8.37

- Install circlip **(a)** and gently rotate circlip without expanding to ensure it is properly seated.

NOTE
- While installing the circlip, ensure the circlip is opened only upto the outer diameter of the shaft.

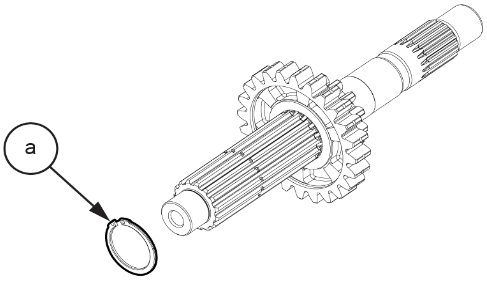


Fig. 5.8.38

Circlip Expander

- Ensure free rotation of 5th drive gear in bush.
- Install the 3rd double gear **(a)** on countershaft with dog on the gear tooth facing outside.

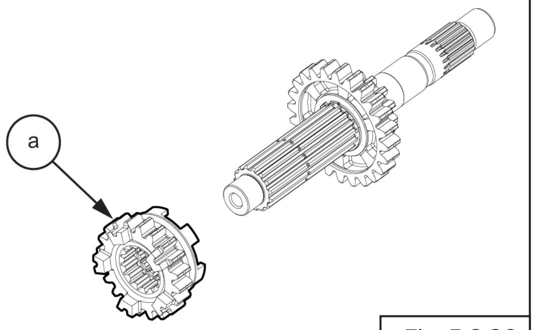


Fig. 5.8.39

NOTE
- While installing the circlip, ensure the circlip is opened only upto the outer diameter of the shaft.

- Install circlip **(a)** and gently rotate circlip without expanding to ensure it is properly seated.

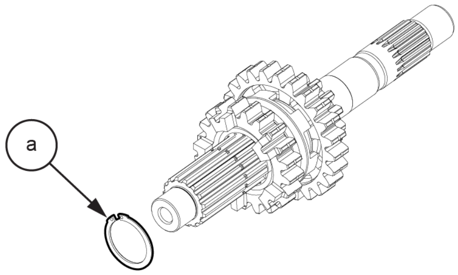


Fig. 5.8.40

Circlip Expander

- Install spline washer **(a)** along with spline bush **(b)** and fourth drive gear **(c)** with dog facing third drive side.

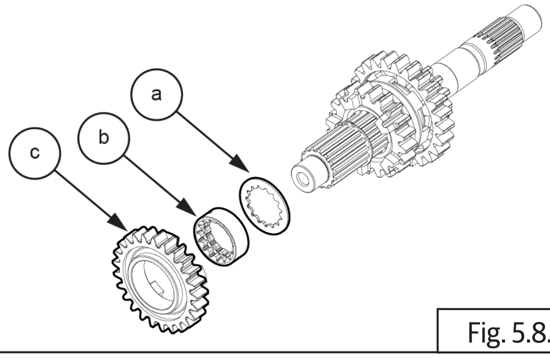


Fig. 5.8.41

- Install second drive gear **(a)** with flat side facing outside and thrust washer **(b)** on countershaft.

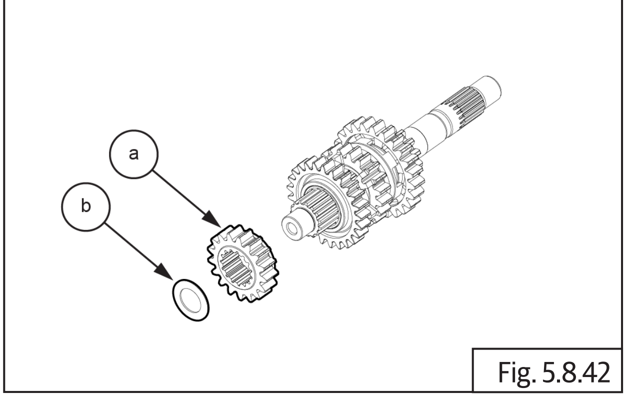


Fig. 5.8.42

5.8.5. Driveshaft Components

- Install second driven gear **(b)** along with bush **(c)** in the driveshaft. Install washer **(a)** from other side.

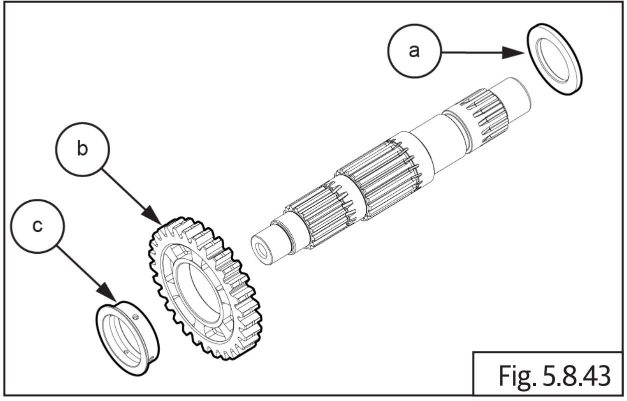


Fig. 5.8.43

- Install circlip **(a)** and gently rotate circlip without expanding to ensure it is properly seated and ensure free rotation of gear in bush.

NOTE
• While installing the circlip, ensure the circlip is opened only upto the outer diameter of the shaft.

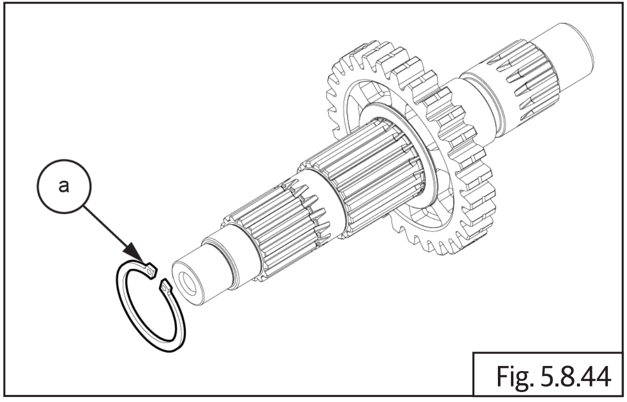


Fig. 5.8.44

	Circlip Expander

- Install fourth gear **(a)** with dog on gear tooth facing the second gear in the driveshaft.

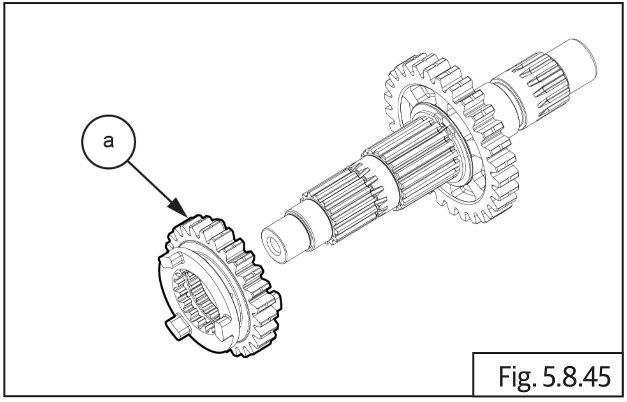


Fig. 5.8.45

- Install washer **(a)** along with install third driven gear **(b)** with slot facing fouth driven gear along with bush **(c)**.

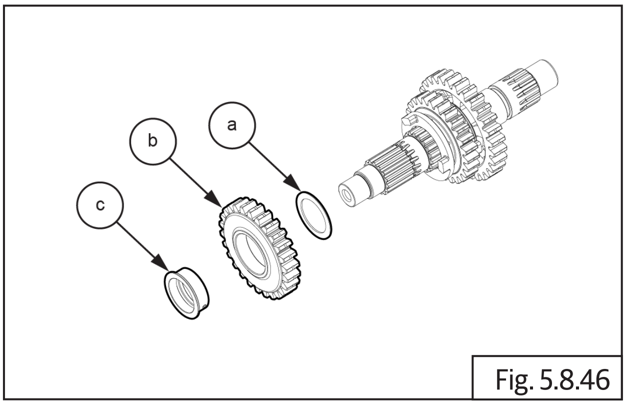


Fig. 5.8.46

NOTE
• While installing the circlip, ensure the circlip is opened only upto the outer diameter of the shaft.

- Install circlip **(a)** and gently rotate circlip without expanding to ensure it is properly seated and ensure free rotation of gear in bush

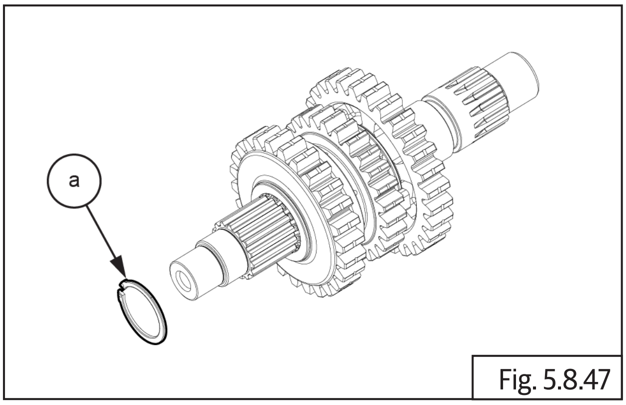


Fig. 5.8.47

	Circlip Expander

- Install 5th driven gear **(a)** with dog facing outside.

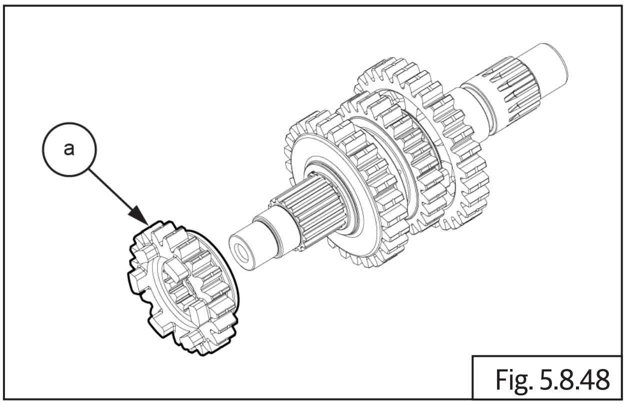


Fig. 5.8.48

- Install thrust washer **(a)** in the driveshaft .

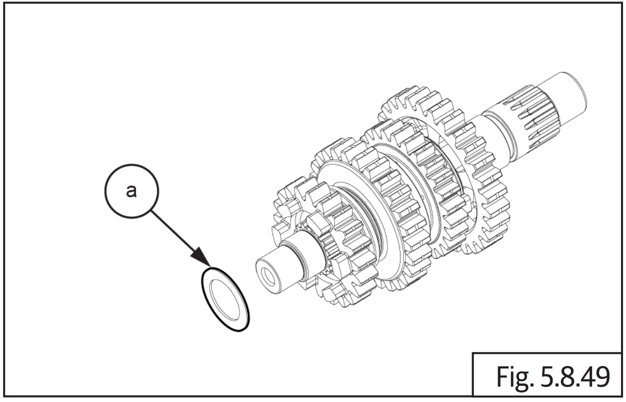


Fig. 5.8.49

- Install first driven gear **(a)** with chamfer in gear tooth facing fourth driven gear.
- Install 1st driven gear washer in the driveshaft **(b)**.

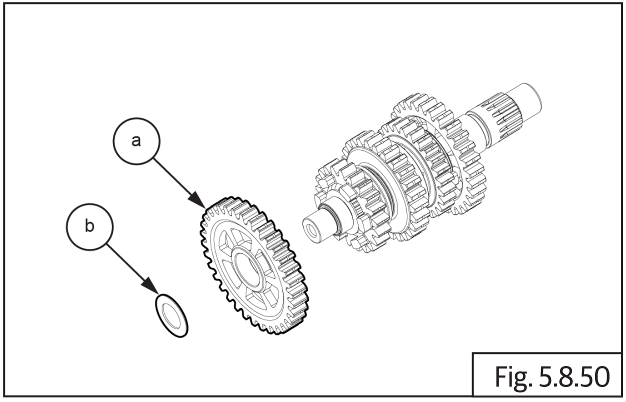


Fig. 5.8.50

5.8.6. Transmission Selector Drum

NOTE

- *Lubricate selector drum and forks with engine oil before installation.*

- Install driveshaft and countershaft in LH crankcase.
- Install selector fork as shown below. Ensure fork identification marks to be facing towards RH crankcase.

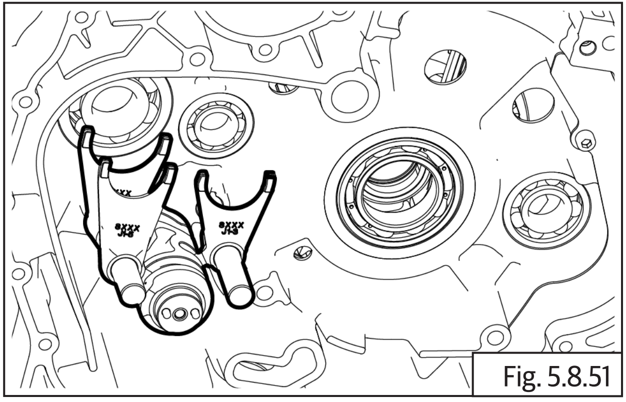


Fig. 5.8.51

- Assemble forks in fourth and fifth gear of drive shaft.
- Likewise assemble fork in third gear in countershaft.

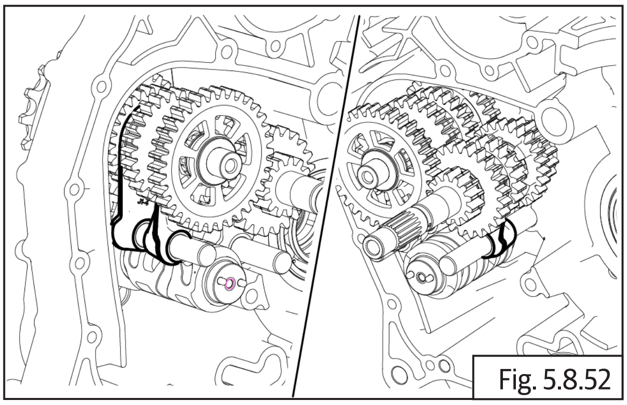


Fig. 5.8.52

5.8.7. Dowel pins

- Insert 2 nos hollow dowel pins **(a)** in the crankcase

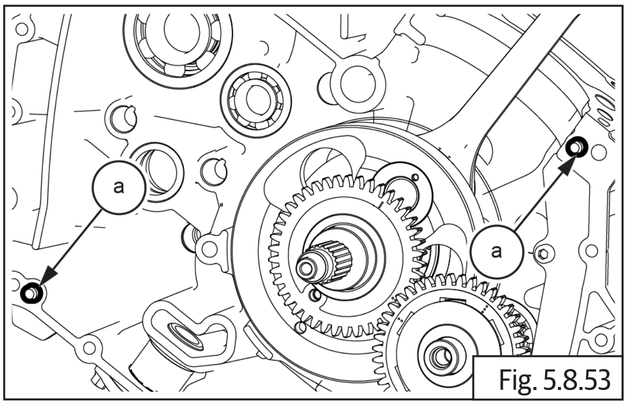


Fig. 5.8.53

5.8.8. Crankcase Closing

- Support LH crankcase assembly firmly on suitable wedges with the mating surface facing up.

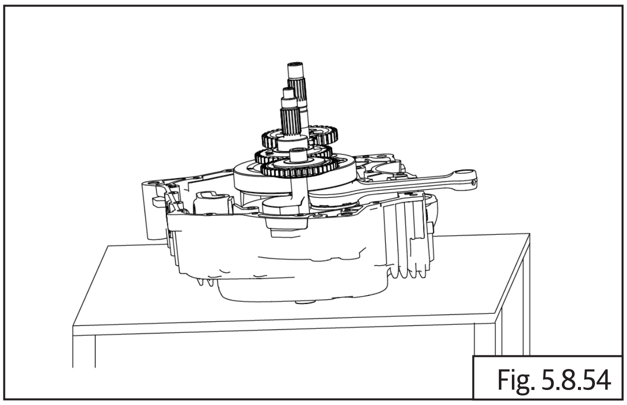


Fig. 5.8.54

NOTE

- *Ensure the mating space both the crankcase are clean and dry.*

- Apply recomemded silicon gasket on the mating surface of the crankcase.

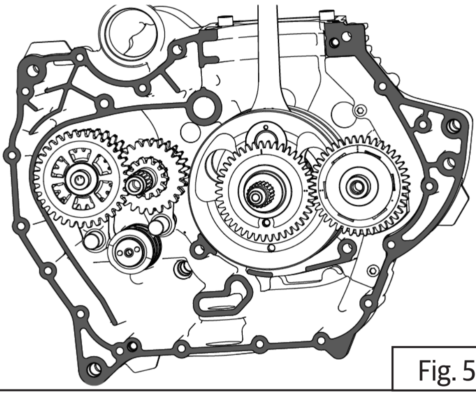


Fig. 5.8.55

- Align the RH case over the LH case and fix it by tapping gently using mallet.

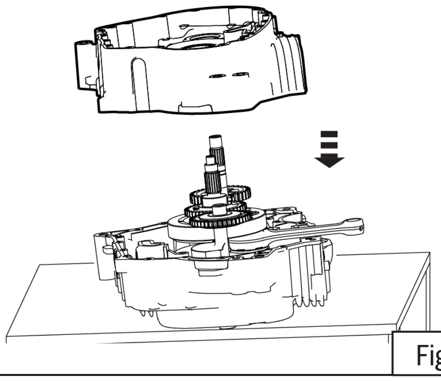


Fig. 5.8.56

5.8.9. Crankcase Bolts Tightening Procedure

⚠ CAUTION

Ensure the gear shift forks are not jammed in the grooves in the gears.

Crankcase bolts and washers are non reusable

- Tighten the crankcase bolts in the following sequence mentioned below,

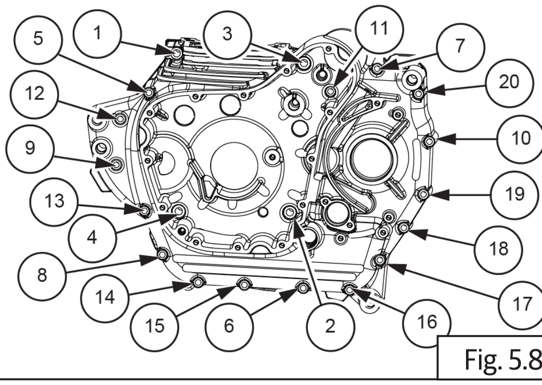


Fig. 5.8.57

5.8.10. Piston and Piston Rings

NOTE

- *Lubricate piston rings with engine oil before installation*

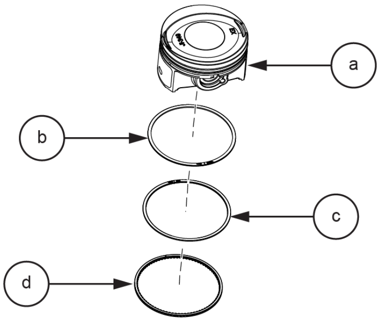


Fig. 5.8.58

a	**Piston**
b	**Top Ring**
c	**Second Ring**
d	**Oil Ring**

Rings Orientation Pattern

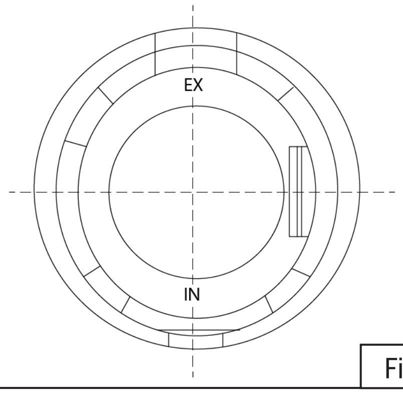


Fig. 5.8.59

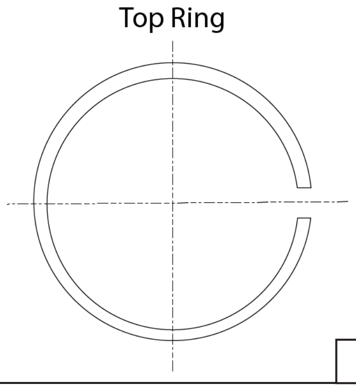


Fig. 5.8.60

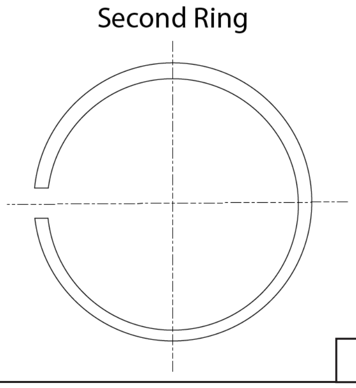

Second Ring

Fig. 5.8.61

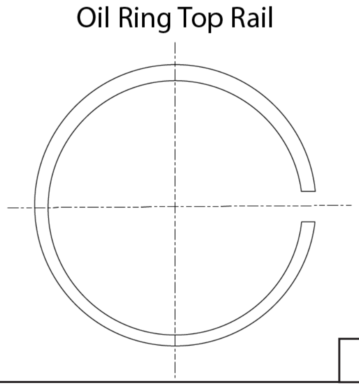

Oil Ring Top Rail

Fig. 5.8.62

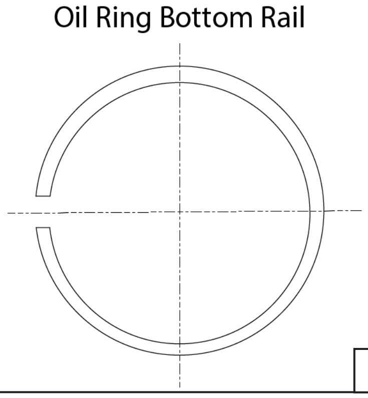

Oil Ring Bottom Rail

Fig. 5.8.63

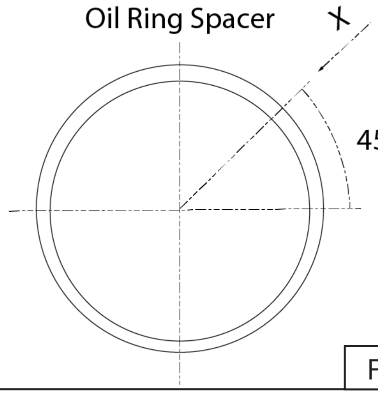

Oil Ring Spacer
45°

Fig. 5.8.64

Piston

NOTE
- *Ensure to cover the crankcase opening below the piston with a clean and dry cloth to avoid the circlip falling into the crankcase.* - *Apply engine oil on piston pin before installation.*

- Install circlip in piston RH
- Install piston **(a)** using gudgeon pin **(b)** in the connecting rod.

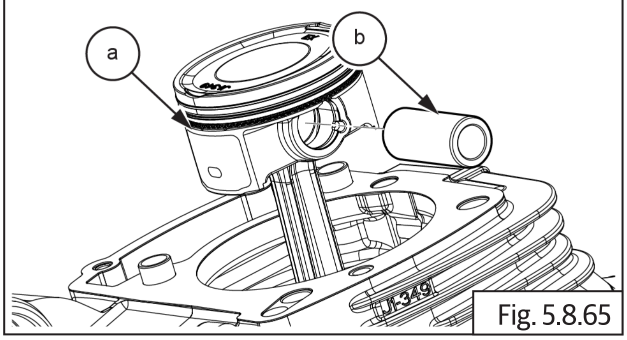


Fig. 5.8.65

- Install circlip **(a)** on piston LH **(b)**.

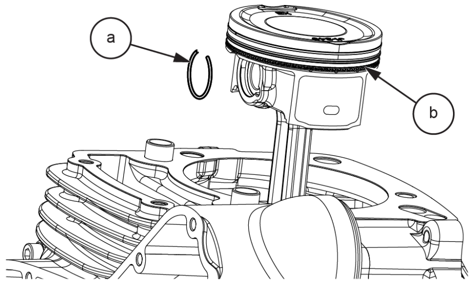


Fig. 5.8.66

	Connector

5.8.11. Cylinder Barrel

NOTE
• *Ensure the gasket seating area in the crankcase is clean.*

- Assemble 2 nos dowel pin **(a)** into cylinder barrel.

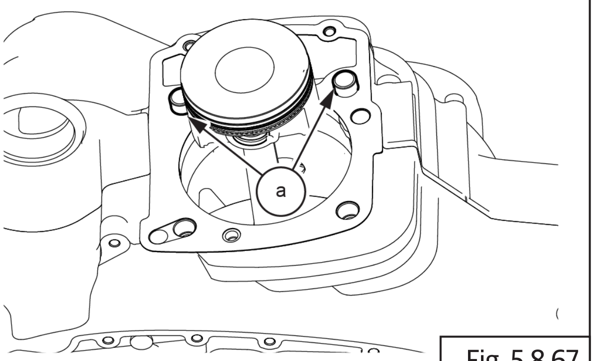


Fig. 5.8.67

	Nose Plier

NOTE
• *Apply a thin coat of engine oil around the cylinder barrel before installing piston*

- Install new cylinder barrel gasket **(a)** on the crankcase by aligning to the two dowel pins.

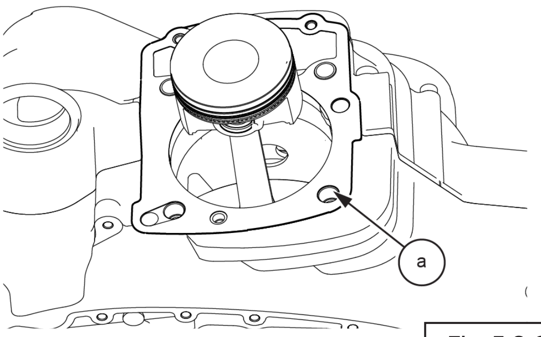


Fig. 5.8.68

- Install the cylinder barrel **(a)** on the crankcase **(b)**.

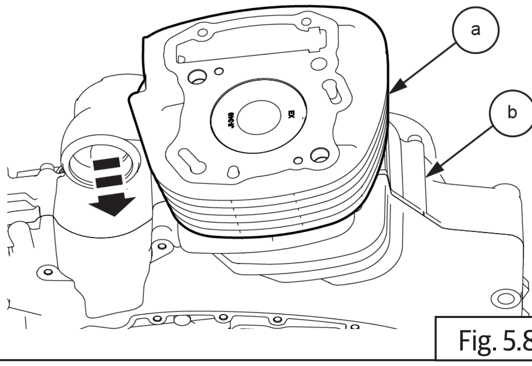


Fig. 5.8.69

5.8.12. Valves and Springs

- Install 2 Nos. valve stem seals **(a)** on the 2 Nos. valve guides **(b)**.

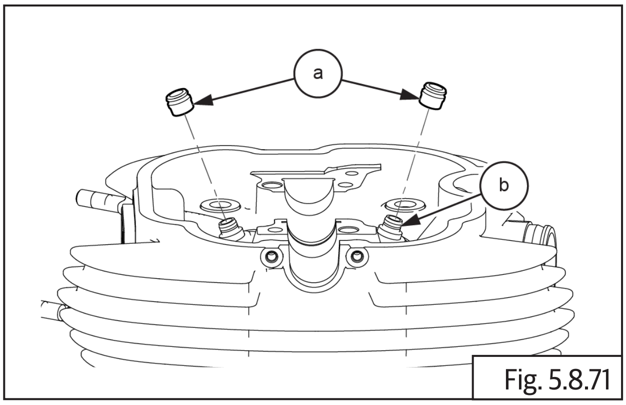


Fig. 5.8.71

NOTE
- *Lubricate valve stem with engine oil before installation.*

- Lubricate and install the corresponding valve **(a)** in the cylinder head **(b)** valve guide from bottom.

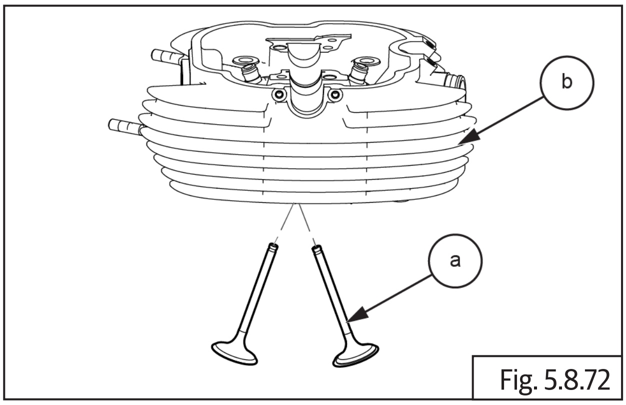


Fig. 5.8.72

- Support the valve from bottom and install valve spring seat and spring **(a)** on valve stem **(b)** from top.

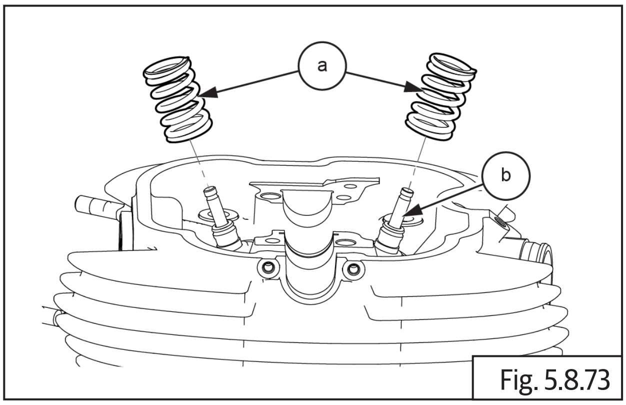


Fig. 5.8.73

- Install retainer on the spring.

⚠ **CAUTION**
During installation ensure the closed coil position in spring is facing downwards

- Insert a special tool **(b)** and compress valve spring **(a)** and "hand tighten" the threaded screw.

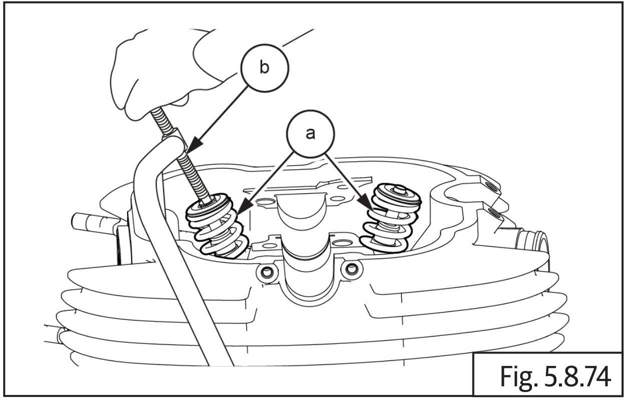
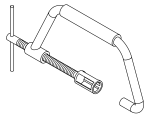


Fig. 5.8.74

SPL 	Part No: ST-27528-2
	Part Name: Valve spring compressor

⚠ **CAUTION**
Never over tighten the special tool screw or it will damage both the valve seating surface and the special tool.

- Insert cotter **(a)** on the valve stem top portion.

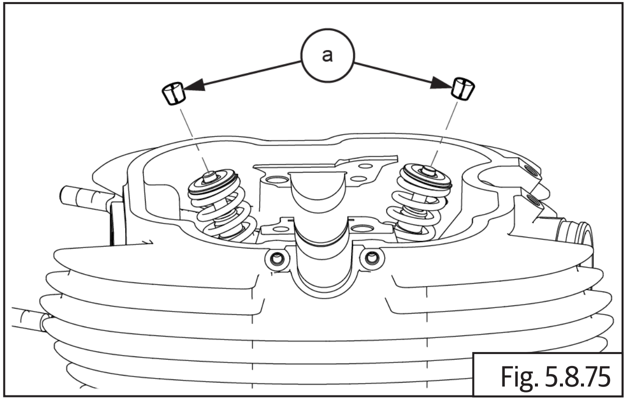


Fig. 5.8.75

- Gently unscrew special tool screw and remove.

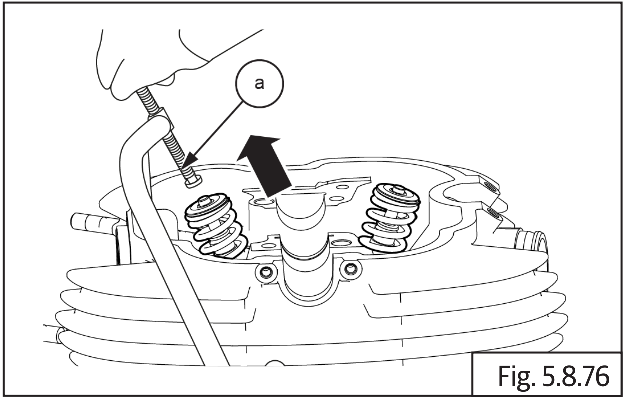


Fig. 5.8.76

- Repeat the above process for another valve.

5.8.13. Timing chain on Crankshaft

- Install timing chain front pad **(a)** by pressing and locking.

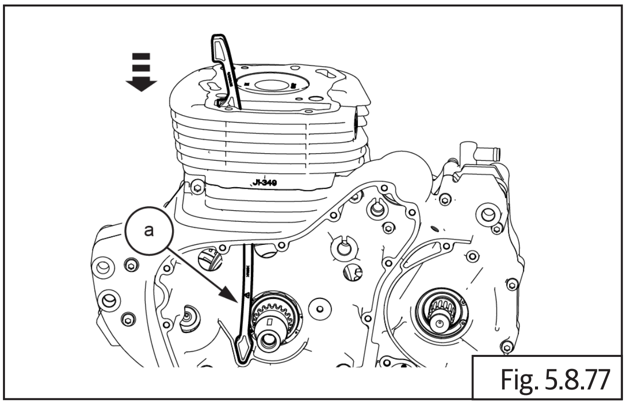


Fig. 5.8.77

- Install the timing chain back pad **(a)** on the crankcase groove using a bolt **(M6)**.

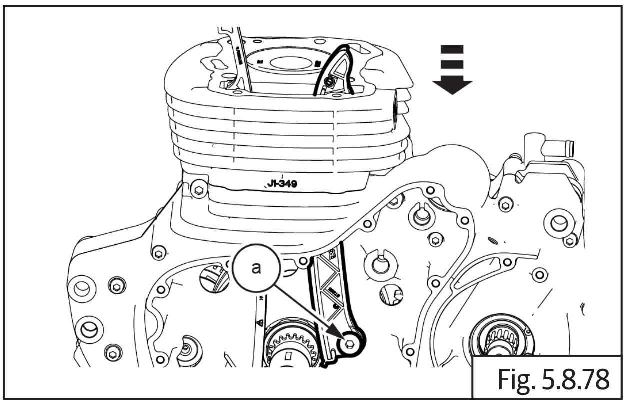


Fig. 5.8.78

🔧	8 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Install timing chain **(a)** on the crankshaft.

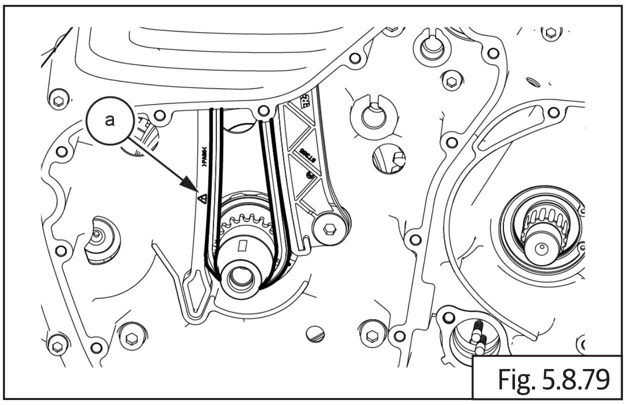


Fig. 5.8.79

5.8.14. Woodruff Key on Crankshaft

- Assemble woodruff key **(a)** on crankshaft and ensure it is facing upwards by rotating crankshaft.

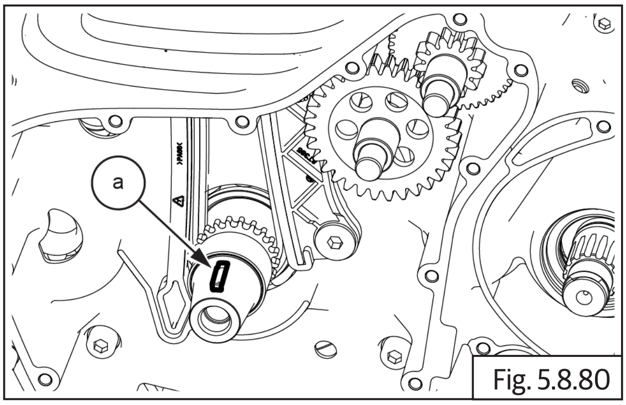


Fig. 5.8.80

5.8.15. Magneto Rotor on Crankcase

NOTE
• *Lubricate starter clutch with engine oil before installation.*

- Install starter clutch with outer ring **(a)** into magneto rotor **(b)** .using **(M6)** bolts **(c)**.

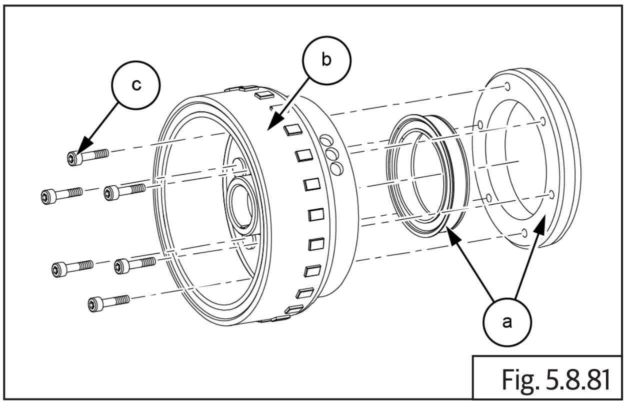


Fig. 5.8.81

- Install gear starter clutch **(a)** into magneto rotor **(b)** by simultanously rotating and pushing.

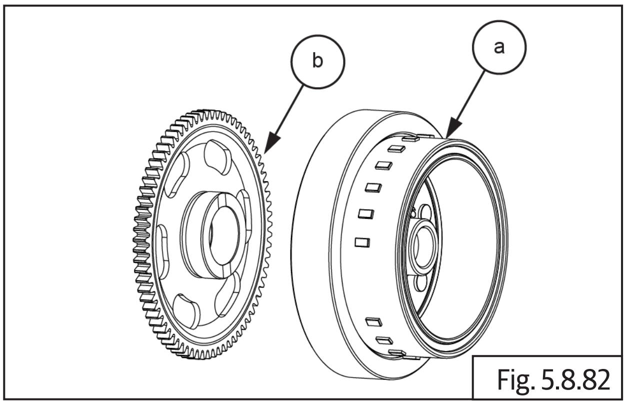


Fig. 5.8.82

- Install hex flange bolt **(M6)** on magneto rotor.

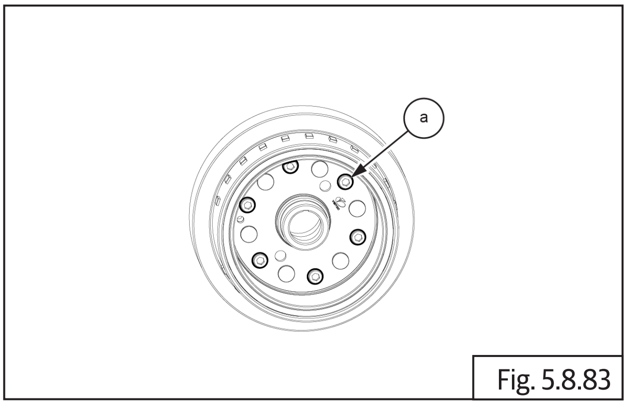


Fig. 5.8.83

🔧	5 mm Allen Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Locate magneto rotor **(a)** on crankshaft. Ensure the slot provided in the rotor is alligned with woodruff key.

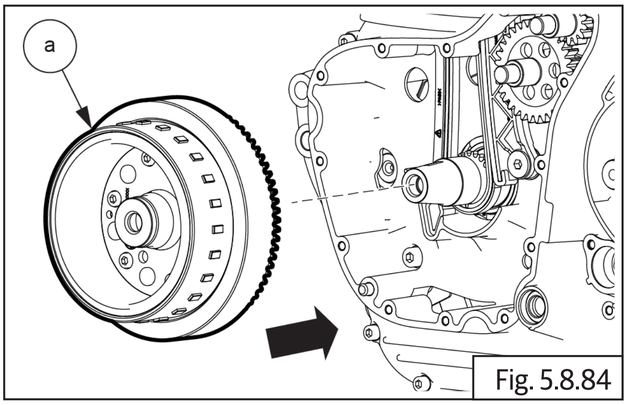


Fig. 5.8.84

- Locate and install Install hex flange bolt **(a) (M12)** on magneto rotor with washer.

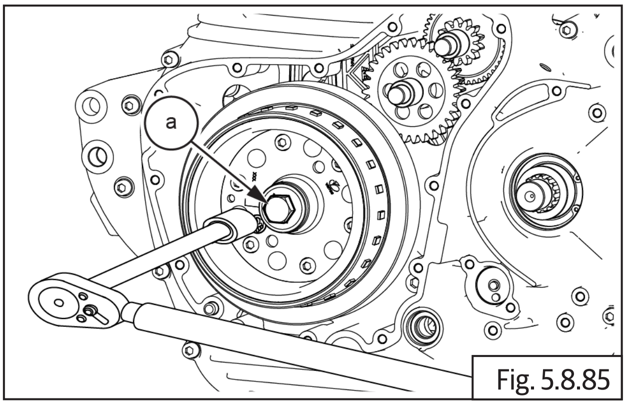


Fig. 5.8.85

🔧	17 mm Socket with Ratchet
Torque	45-55 N-m/4.5-5.5 kgf-m

NOTE

- *Ensure Crankshaft & Magneto taper free from oil & foreign particles.*
- *Taper surfaces has to be cleaned with Isopropyl solution before assembly*

5.8.16. Cylinder Head

- Locate new head gasket **(a)** along with the dowel pin on the cylinder barrel **(b)**.
- Ensure head gasket orientation to be matching the oil hole positon.

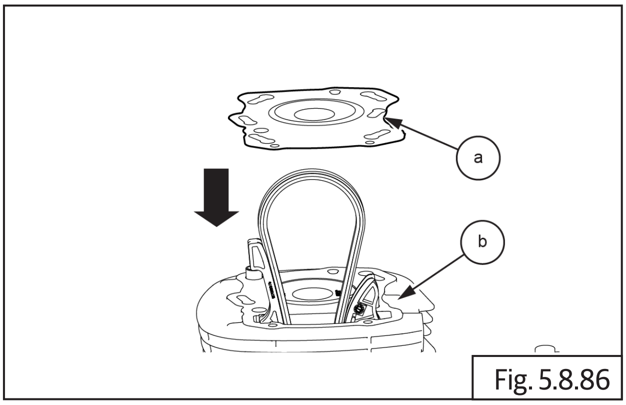


Fig. 5.8.86

- Align the cylinder head assembly to the dowel pin 2 nos **(a)** on the cylinder barrel.

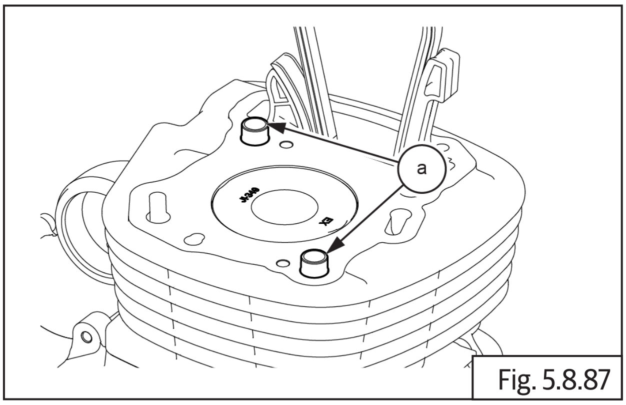


Fig. 5.8.87

NOTE

- *Cylinder Head Bolts and washers* **M10** *are* **NON REUSABLE**.
- *Apply engine oil to the threads of the bolt before installation.*

- Install cylinder head using 4 Nos. bolts **(M10) (a)** along with washers.

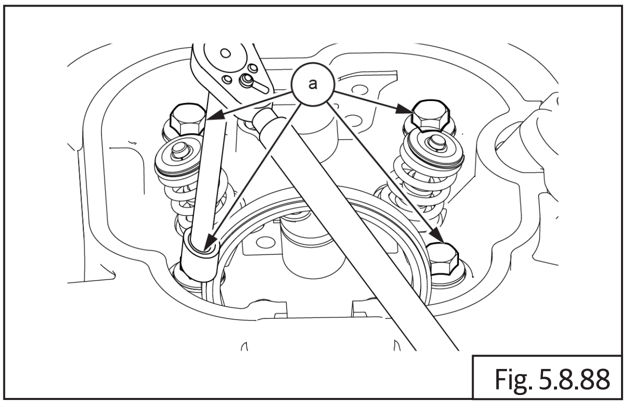


Fig. 5.8.88

🔧	12 mm Socket with Ratchet
Torque	12-18 N-m/1.2-1.8 kgf-m

- Locate and install 2Nos **(M6) (a)** bolts on cylinder head assembly.

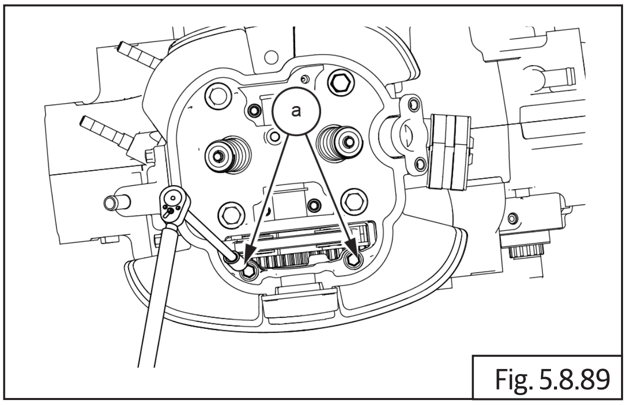


Fig. 5.8.89

🔧	8 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

5.8.17. Camshaft Assembly

NOTE
• *Lubricate camshaft lobe and journals with engine oil before installation.*

- Hold the timing chain **(a)** in stretched condition and gently rotate crankshaft clockwise in order to bring piston in TDC.

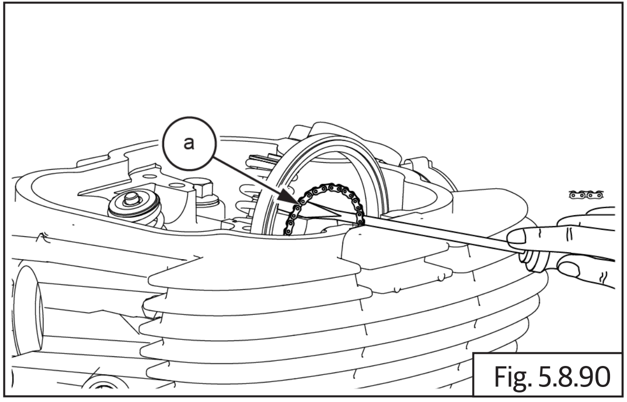


Fig. 5.8.90

NOTE
• *Lock the crankshaft using the special tool from crankcase RH.*

⚠ **CAUTION**
Do not rotate crankshaft anti-clockwise

- Install C washer **(a)** on cylinder head **(b)**.

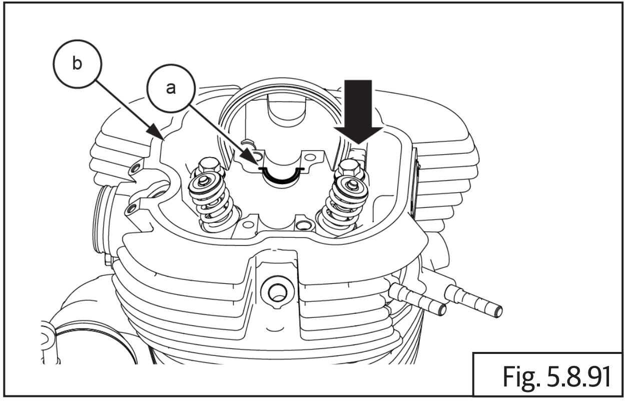


Fig. 5.8.91

- Install camshaft **(a)** on cylinder head.

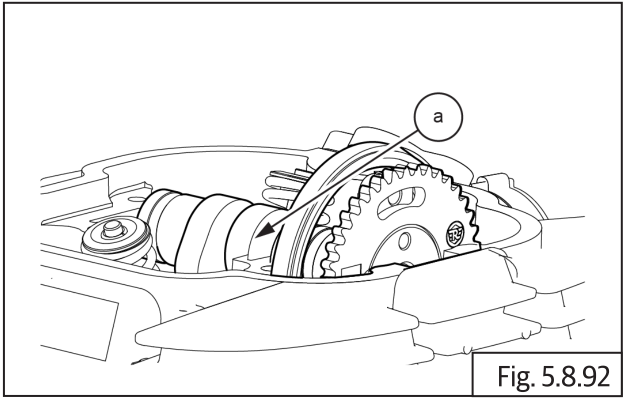


Fig. 5.8.92

- Install cam chain **(b)** on the camshaft sprocket **(a)**.

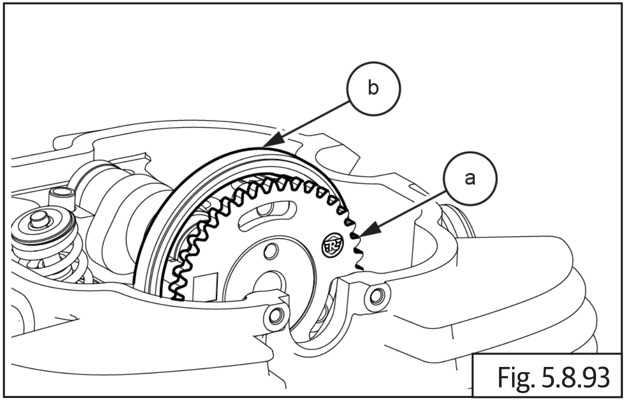


Fig. 5.8.93

- Locate 1 Nos. bolts **(M6) (a)** on camshaft sprocket

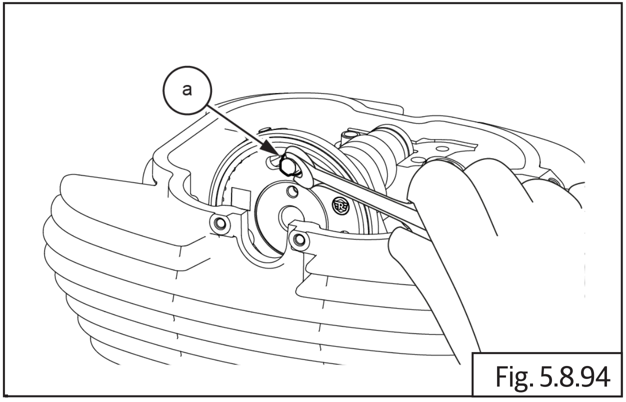


Fig. 5.8.94

	8 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Rotate crankshaft in order to access the second bolt **(a)** on camshaft sprocket

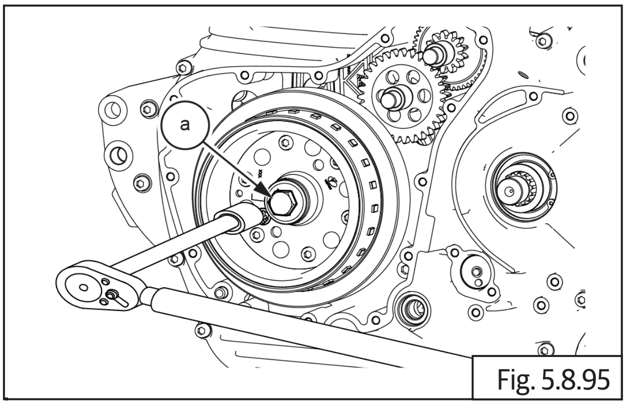


Fig. 5.8.95

- Locate 1 Nos. bolts **(M6) (a)** on camshaft sprocket

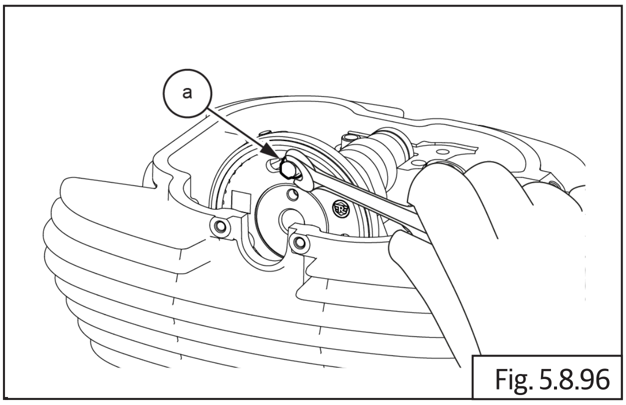


Fig. 5.8.96

	8 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

5.8.18. Rocker Carrier in Cylinder Head

⚠ CAUTION

Ensure the rocker shaft assy direction , Minus shape slot & M6 tap should be facing outside

⚠ CAUTION

Ensure rocker shaft is assembles in the corresponding inlet and exhaust sides as dismantled.

NOTE

- *Lubricate rocker arm and rocker arm shafts with engine oil before installation.*

- Align rocker arm in carrier **(a)** and insert spindles **(b)** in carrier.

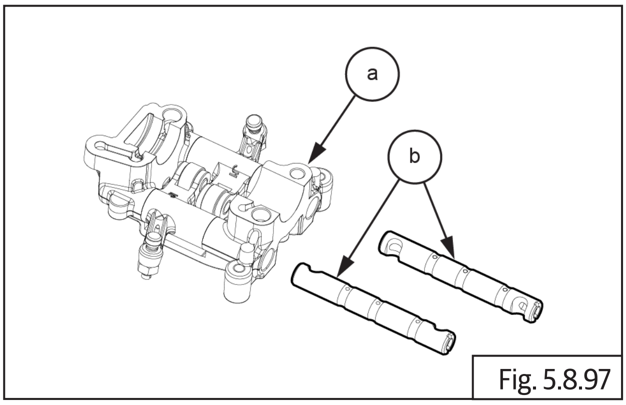


Fig. 5.8.97

- Gently rotate the crankshaft and insert the special tool **(a)** on crankcase RH to lock the crankshaft.

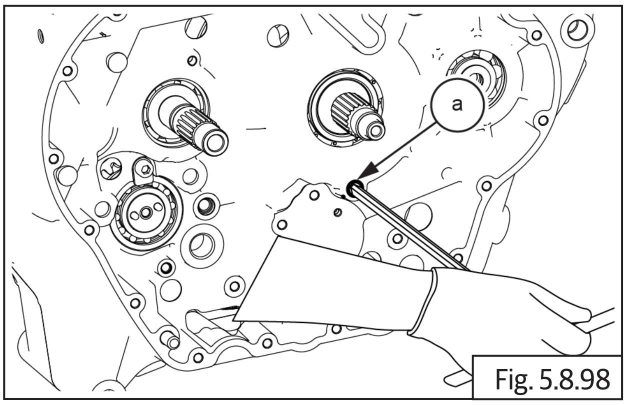


Fig. 5.8.98

- Align the rocker carrier assembly **(a)** on the cylinder head.

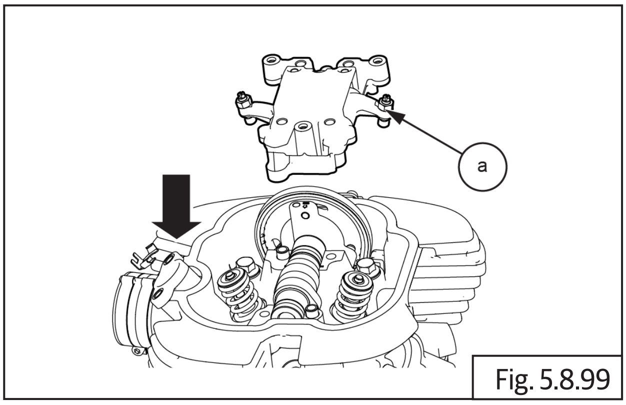


Fig. 5.8.99

⚠ CAUTION
Rocker carrier bolts are one time use only. DO NOT reuse.

- Install 4 Nos. bolts **(M6) (a)** on rocker carrier in crisscross pattern. Apply engine oil on the threads of the bolt before installation

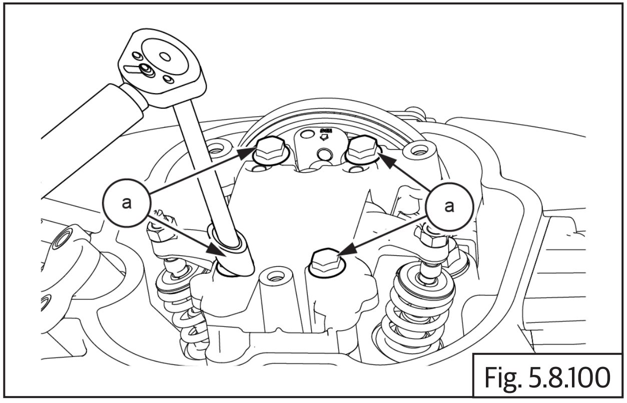


Fig. 5.8.100

🔧	8 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

5.8.19. Tappet Clearance Adjustment

- Locate and install TDC setting tool **(a)** in camshaft.

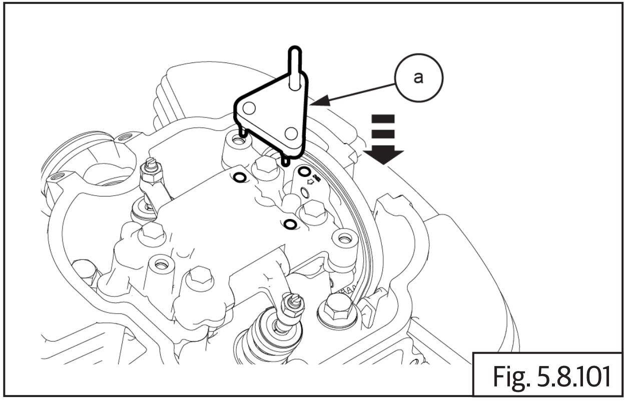


Fig. 5.8.101

- Loosen tappet adjuster locknut with special tool.

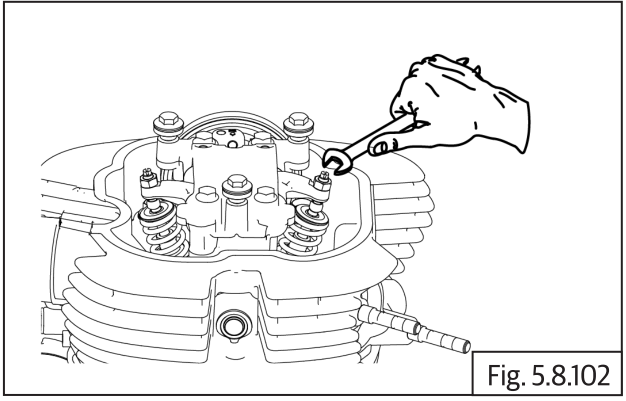


Fig. 5.8.102

- Insert a screwdriver into the tappet adjusting tool and ensure it is seated correctly on the adjuster screw.

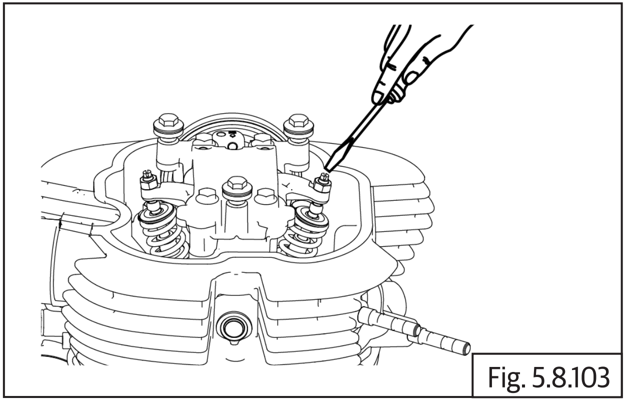


Fig. 5.8.103

- Insert feeler strip between adjuster screw and valve stem as per thickness mentioned below.

For intake - 0.08 mm

For exhaust - 0.18mm

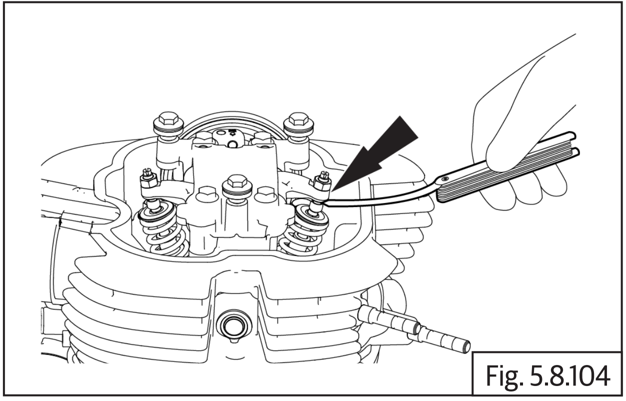


Fig. 5.8.104

- Gently pull out feeler strip (a) and check if it comes out freely OR with resistance.
- If feeler strip comes out freely tighten the adjuster screw.
- If feeler strip movement is hard loosen the adjuster screw.
- Adjust the screw using screwdriver simultaneously to check the correct and smooth movement of feeler strip.
- After adjusting the tappet remove feeler strip and gently lock the lock nut against rocker arm using the special tool.
- Remove screw driver and both special tools.

🔧	8 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

NOTE

Check tappet clearances one more time before locking the lock nut

⚠ CAUTION

Do not adjust tappets with less OR no clearance as it will result in poor compression, valve burn-out and wear-out of tappet adjuster foot. Do not adjust tappet with high clearance as will result in noise and insufficient opening of the valves

5.8.20. Cylinder Head Cover

NOTE

- *Ensure the cylinder head cover surface and gasket seating groove are clean.*
- *Ensure sealant is applied in the head gasket before assembly.*

- Install rubber gasket **(a)** in the cylinder head **(b)** and ensure it is seated properly.

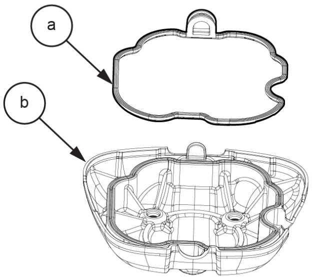


Fig. 5.8.105

- Install cylinder head cover using new seals, washers and 3 Nos. bolts **(a) (M6)**.

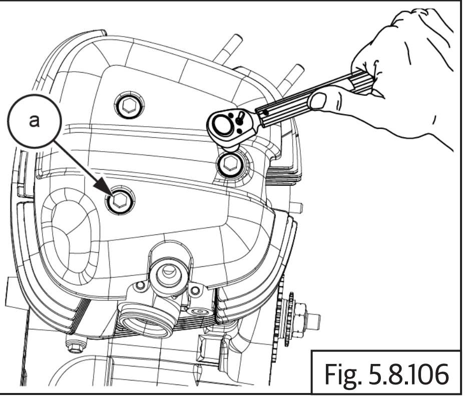


Fig. 5.8.106

🔧	8 mm Socket with Torque Wrench
Torque	10-12 N-m/1.0-1.2 kgf-m

5.8.21. Spark Plug

- Install spark plug **(a)** along with washer on cylinder head.

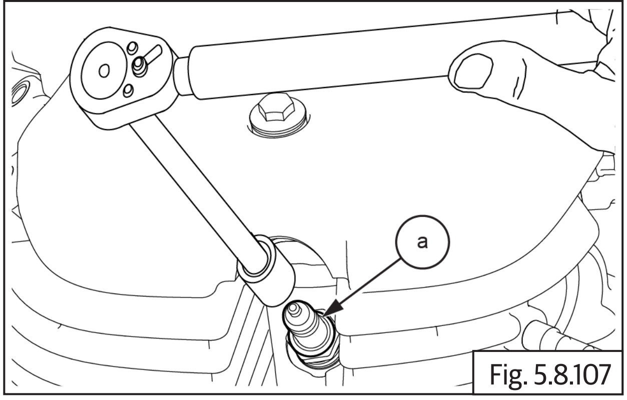


Fig. 5.8.107

🔧	16 mm Deep Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

5.8.22. Star Index

- Locate star index **(a)** with pins **(b)** locating on the selector drum.

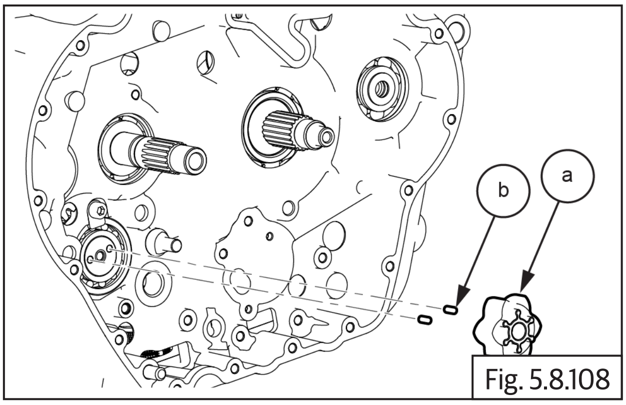


Fig. 5.8.108

- Locate star index bolt **(a)** and tighten.

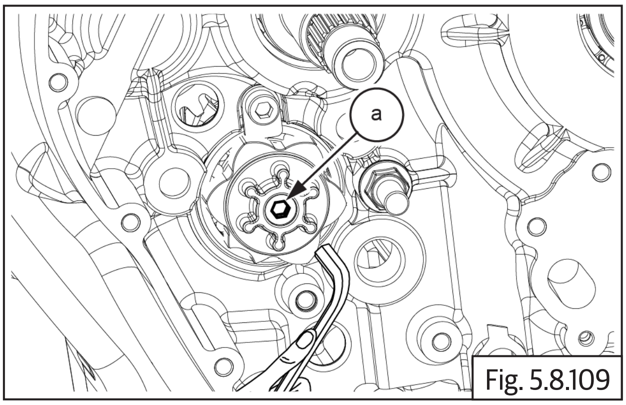


Fig. 5.8.109

🔧	5 mm Allen Socket with Torque Wrench
Torque	10-12 N-m/1.0-1.2 kgf-m

5.8.23. Star Index Stopper

- Locate spring **(a)** in crackcase RH.

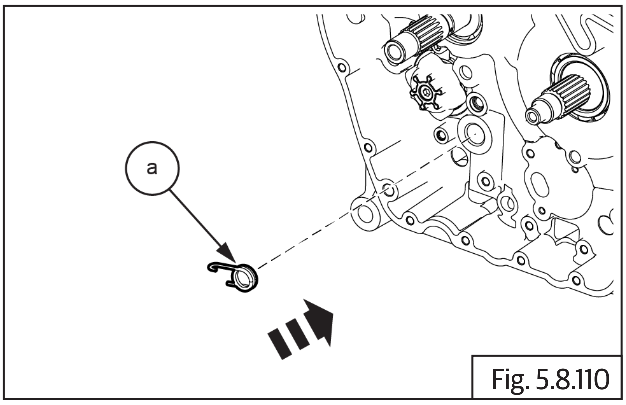


Fig. 5.8.110

- Locate washer **(a)** and stopper arm **(a)** above spring.
- Ensure spring is seated on the groove provide in the stopper arm.

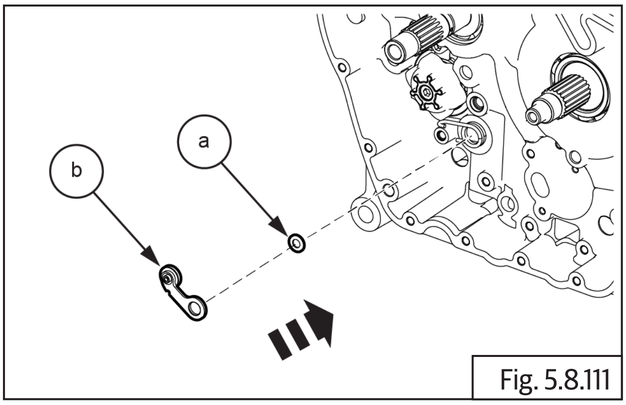


Fig. 5.8.111

- Locate bolt **(a)** and tighten.

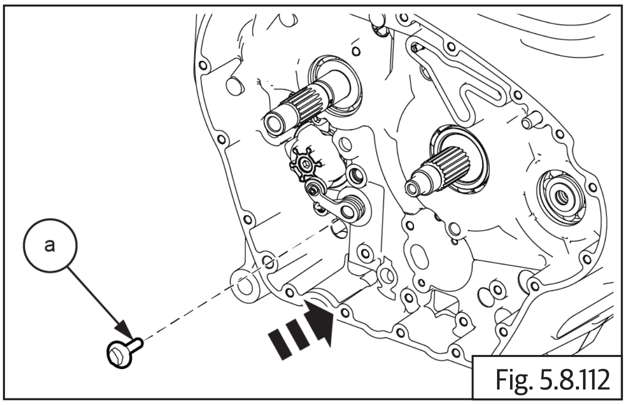


Fig. 5.8.112

🔧	10 mm Deep Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

5.8.24. Gear Shifter Shaft

- Insert gear shaft **(a)** from RH side of the engine.

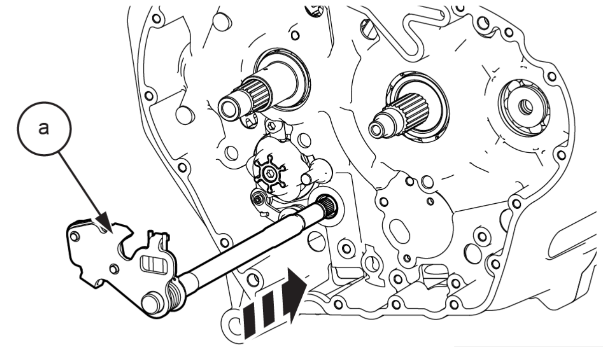


Fig. 5.8.113

- Locate washer **(b)** and circlip **(a)** on shifter shaft **(a)**.

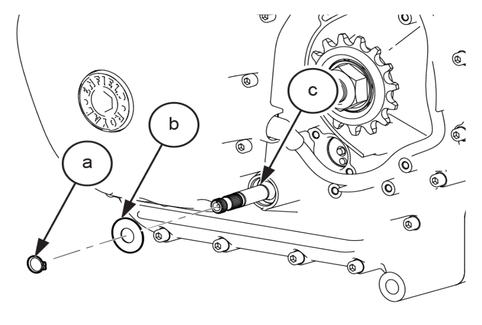
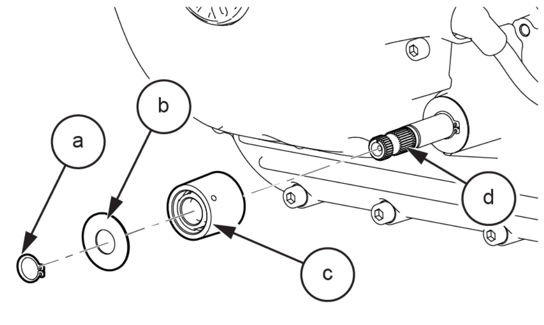


Fig. 5.8.114

	Circlip plier

- Locate bush **(c)** along with washer **(b)** and install circlip **(a)** on shifter shaft **(a)**.



	Circlip plier

5.8.25. Clutch Assembly (LH thread)

- Locate spacer primary gear **(a)** on the counter shaft.

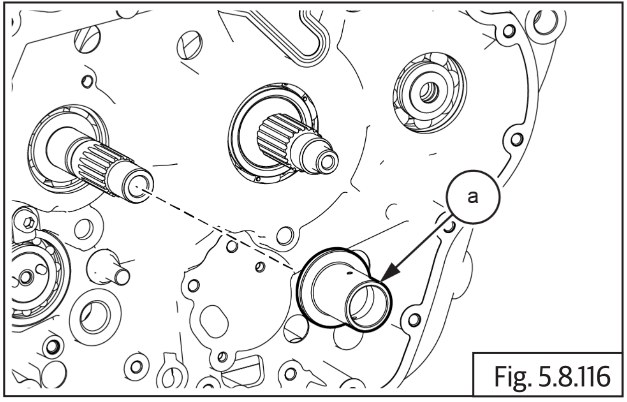


Fig. 5.8.116

- Install outer clutch housing assembly on counter shaft, with its lugs facing outside.

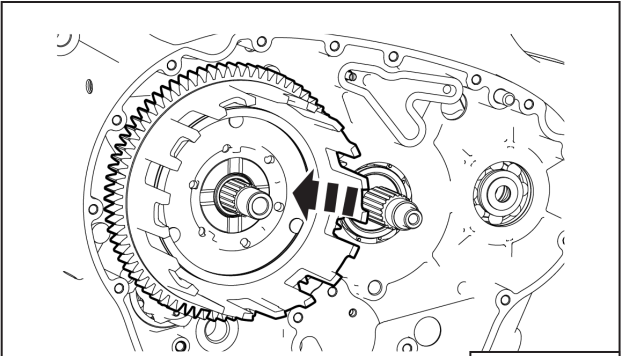


Fig. 5.8.117

- Locate washer **(a).**

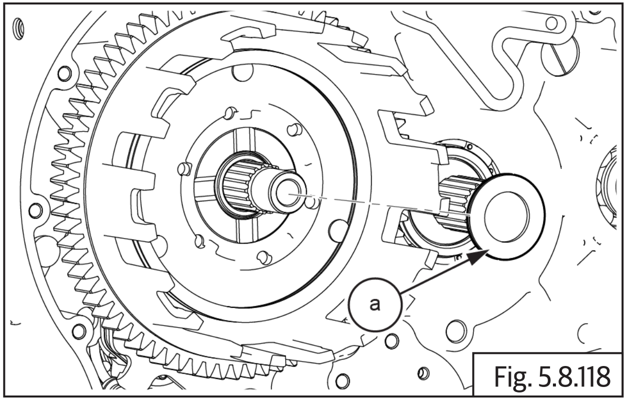


Fig. 5.8.118

- Install center clutch in outer clutch.

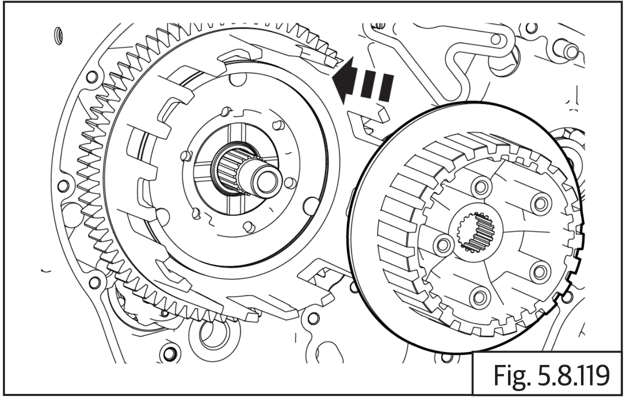


Fig. 5.8.119

- Install plain washer and belleville washer and tighten the hex “U” nut using special tool.

⚠ CAUTION

Hex “U” nut is a left hand thread. Wrong rotation may damage the threads

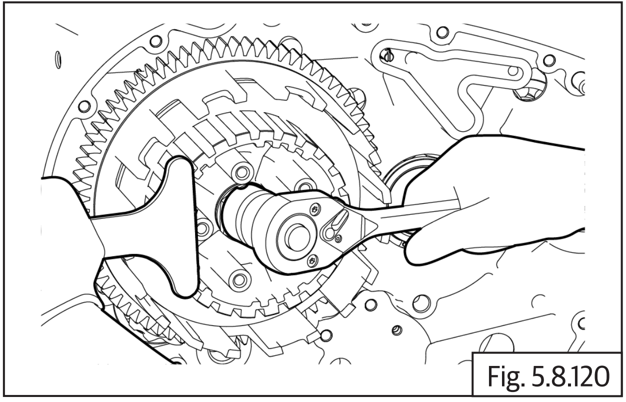
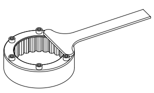


Fig. 5.8.120

SPL 	Part No: ST30921/A
	Part Name: Clutch hub holder

	24 mm Socket with Ratchet
Torque	110-130 N-m/11.0-13.0 kgf-m

- Assemble friction plates **(a)** and steel plates **(b)** in the same order, in which those were dismantled (use line marks made during dismantling for the assembly)

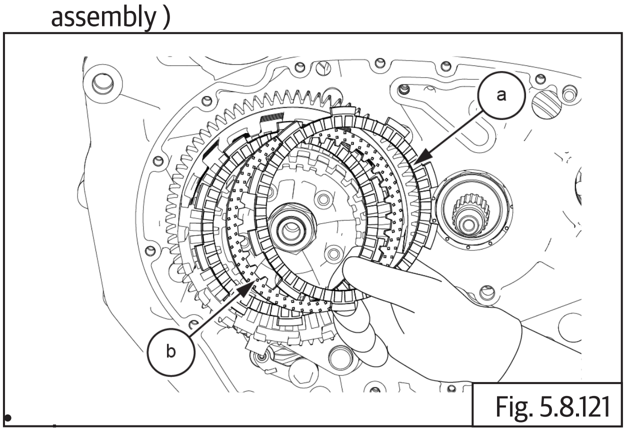


Fig. 5.8.121

NOTE

- *Last friction plate should assemble on clutch housing claw.*

- Install pull rod **(a)**.

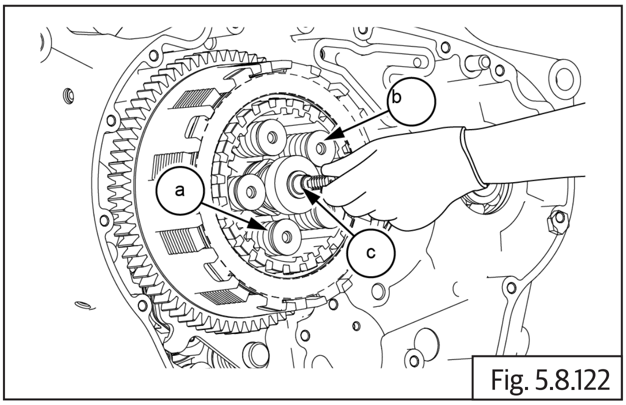


Fig. 5.8.122

- Install pressure plate, spring and bolts **(a)** evenly and tighten the bolts in given sequence.
- Blue - First tightness sequence
  Black - Final torque

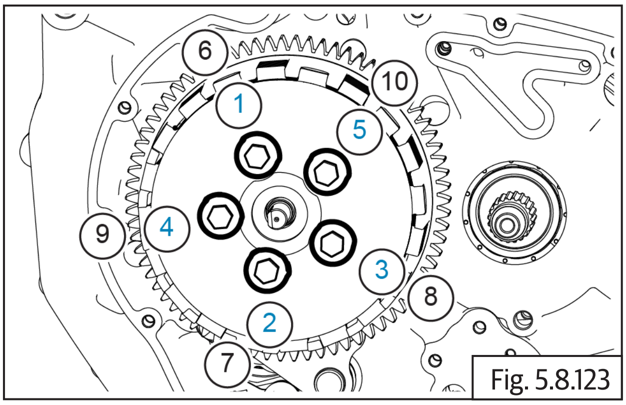


Fig. 5.8.123

	8 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

5.8.26. Crank gear (LH Thread)

⚠ CAUTION

Ensure metal grading of crank gear and clutch housing gear are the same.

- Apply engine oil and install crank gear **(a)** and washer on the crankshaft.
- Ensure the clutch housing gear is correctly meshed with the crankshaft gear.

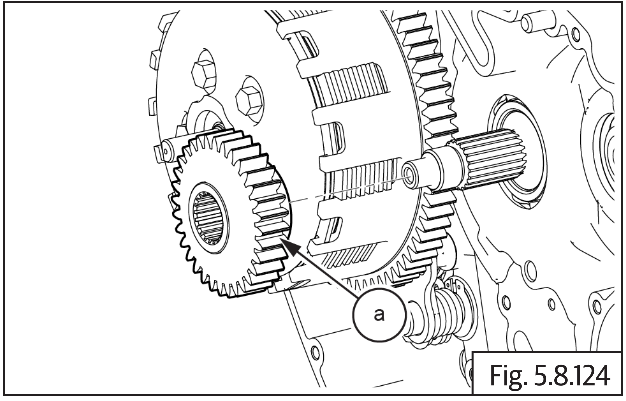


Fig. 5.8.124

- Install washer **(a)** along with oil pump drive sprocket **(b)** and belleville washer **(c)**.
- Assemble the washer so that the OUT mark is facing the outside of the Crank gear.

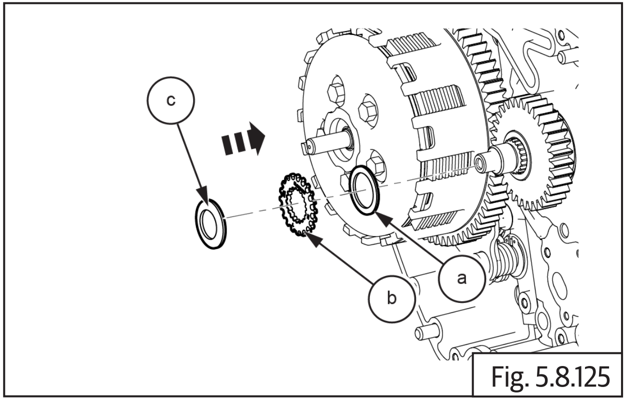


Fig. 5.8.125

⚠ CAUTION

Hex "U" nut is a left hand thread. Wrong rotation may damage the threads

- Locate and tighten crankshaft gear nut **(a)** and tighten.

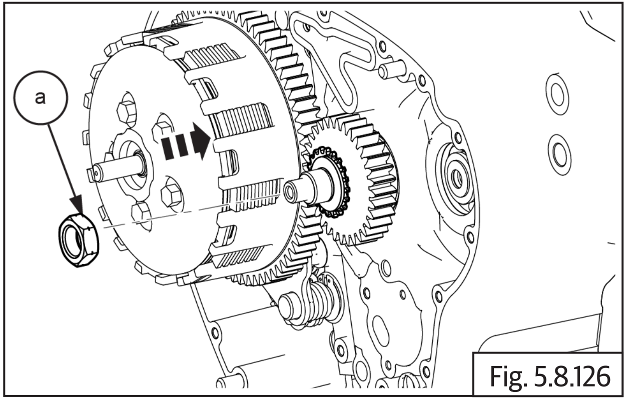


Fig. 5.8.126

	24 mm Socket with Ratchet
Torque	40-60 N-m/4.0-6.0 kgf-m

5.8.27. Balancer Shaft Bolt

- Lock the crank gear using special tool **(a)**.

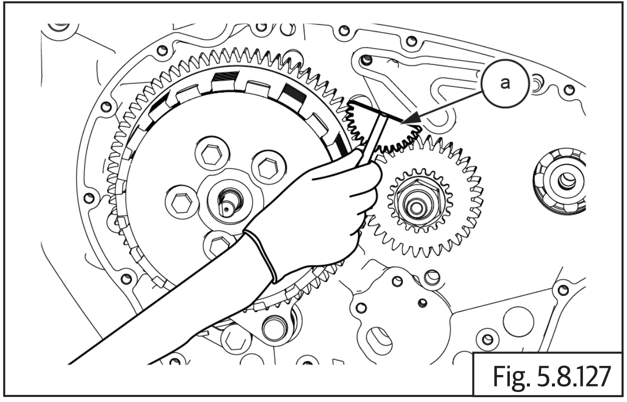
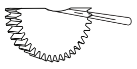


Fig. 5.8.127

SPL 	Part No: ST30922/A
	Part Name: Crank Lock Tool

- Install 2 Nos. washers **(a)** along with bolt **(b)** to the balancer shaft and tighten it.

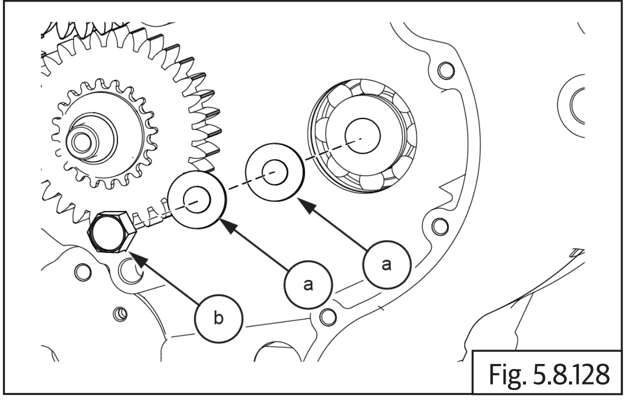


Fig. 5.8.128

🔧	14 mm Socket with Ratchet
Torque	40-60 N-m/4.0-6.0 kgf-m

5.8.28. Oil Pump

NOTE

- *Oil pump does not have any servicable parts hence has to be replaced as an entire assembly.*
- *Oil pump metal gasket & O ring is one time use only. DO NOT reuse.*

- Install oil pump metal gasket **(a)** along with oil pump **(b)** on the crankcase dowel.

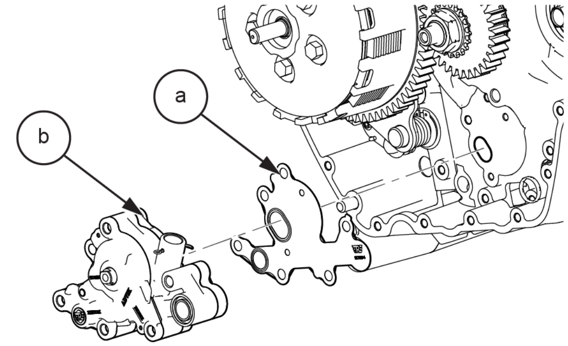


Fig. 5.8.129

- Install 6 Nos. Hex flange head bolts **(M6)** **(a)** in criscross pattern.

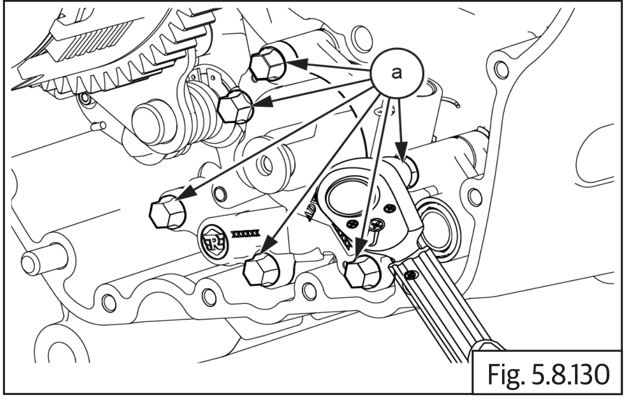


Fig. 5.8.130

🔧	8 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Install the oil pump chain **(a)** and driven sprocket **(b)** along with the washer **(c)**.

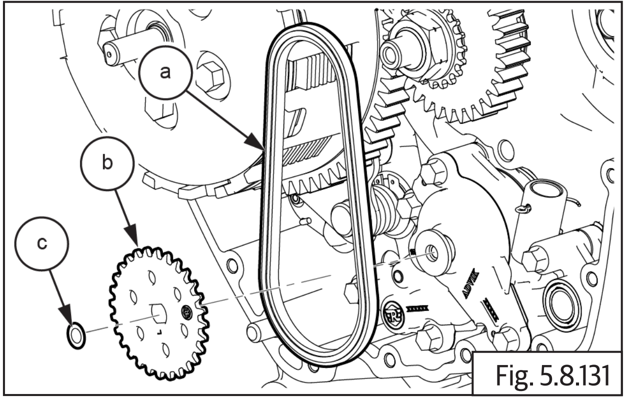


Fig. 5.8.131

- Install bolt **(a)** **(M6)** and tighten it.

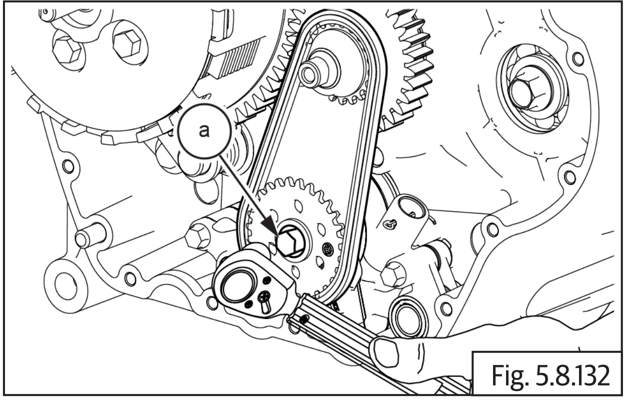


Fig. 5.8.132

🔧	8 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

5.8.29. Transmission Jet

NOTE
- *Ensure gearbox is in neutral condition*

- Locate and tighten transmission jet **(a)** into crankcase.

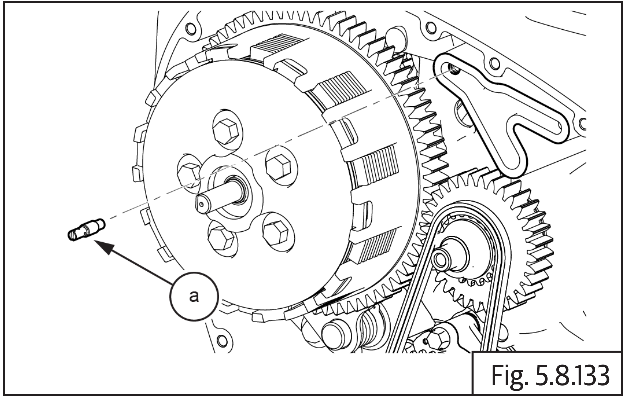


Fig. 5.8.133

🔧	Screw Driver
Torque	0.75-1.25 N-m/0.075-0.125 kgf-m

5.8.30. Oil Level Window

- Locate oil level window inside cover LH **(a)**.

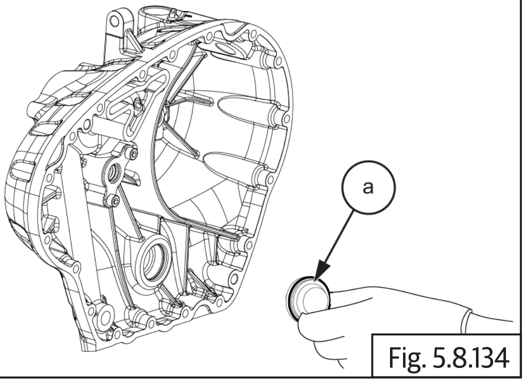


Fig. 5.8.134

- Locate circlip **(a)** in the grove provided.

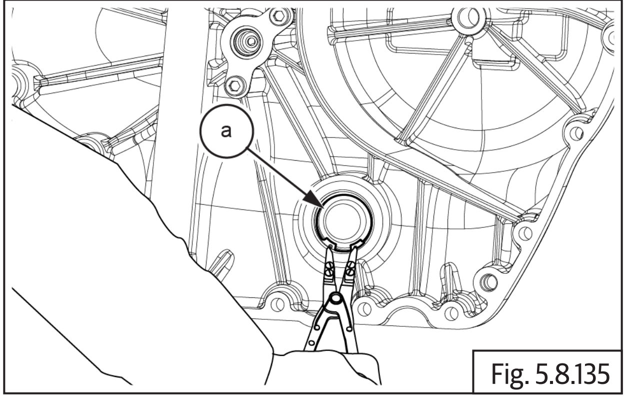


Fig. 5.8.135

🔧	Circlip plier

5.8.31. Oil Bypass seal

- Locate oil seal **(a)** in cover LH and fix it firmly using a rubber mallet.

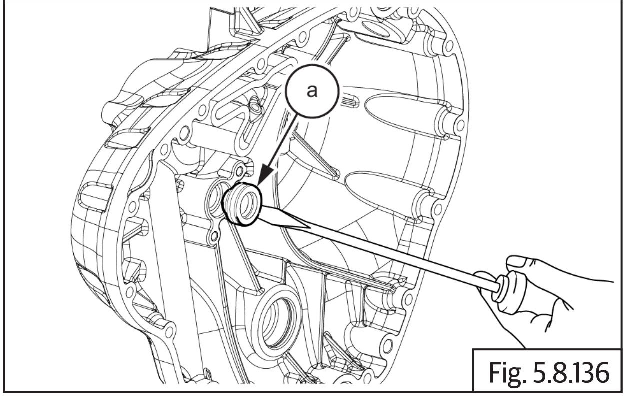


Fig. 5.8.136

🔧	Rubber Mallet

- Locate retainer plate **(b)** along with 2 Nos M6 bolts **(a)**.

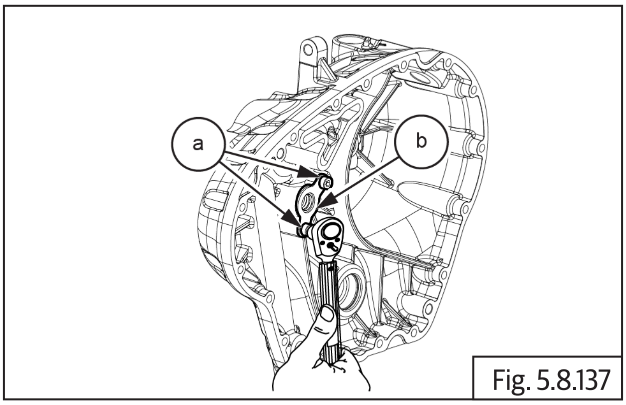


Fig. 5.8.137

🔧	5 mm Allen socket with Ratchet

5.8.32. Clutch Actuating Shaft

- Gently insert clutch actuating shaft **(a)** into cover RH**(b)** with gears facing inside and serrations facing outside.

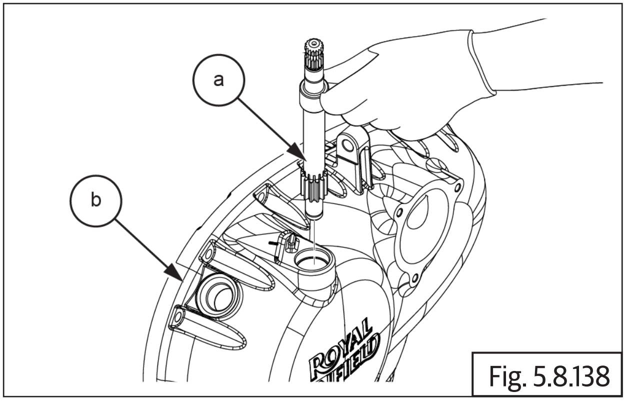


Fig. 5.8.138

- Assemble oil seal **(a)** with the lips facing downwards along with washer **(b)** into cover RH.

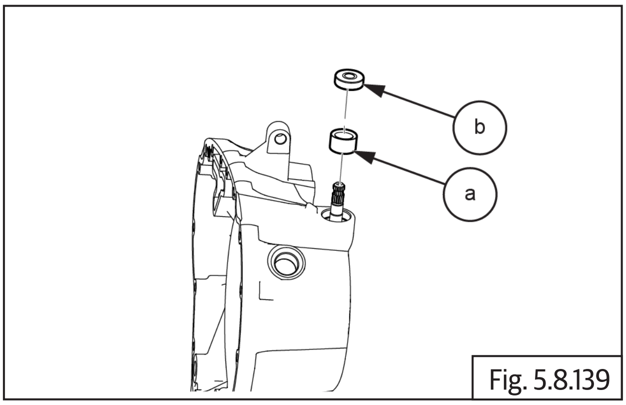


Fig. 5.8.139

- Locate E clip **(a)** and washer **(b)** from the bottom of the clutch actuating shaft inside clutch cover.

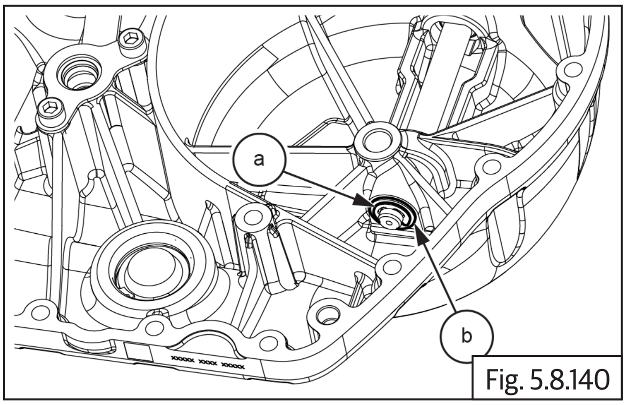


Fig. 5.8.140

🔧	Nose plier

5.8.33. Clutch Actuating Lever Assembly

- Assemble clutch actuating lever **(a)** and spring onto clutch shaft **(b)** on RH cover.
- Rotate shaft fully and assemble actuating lever.

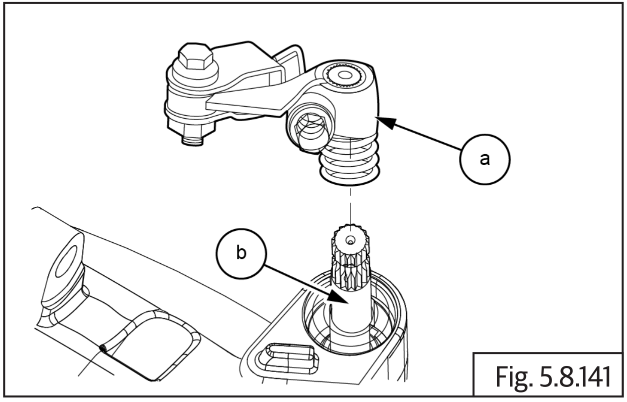


Fig. 5.8.141

- Locate and tighten Hex head bolt **(M6) (a)** in clutch actuating lever assembly **(b)**.

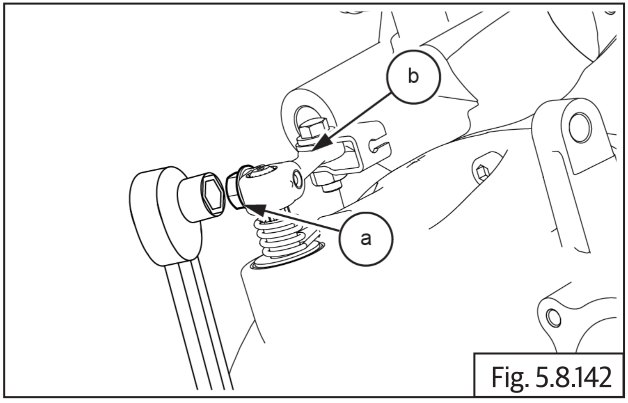


Fig. 5.8.142

🔧	10 mm Socket with Torque Wrench
Torque	10-12 N-m/01.0-1.2 kgf-m

5.8.34. Cover RH

- Install 2 nos dowel pins **(a)** on RH crankcase

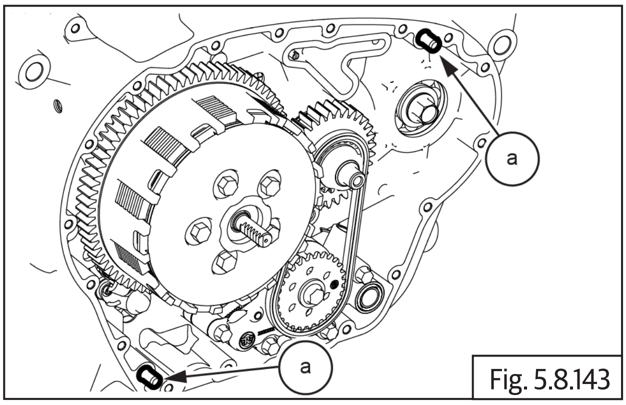


Fig. 5.8.143

- Install the clutch cover **(b)** on the crankcase along with gasket **(a)** and tighten the 18 Nos. bolts **(M6)** in the given sequence.

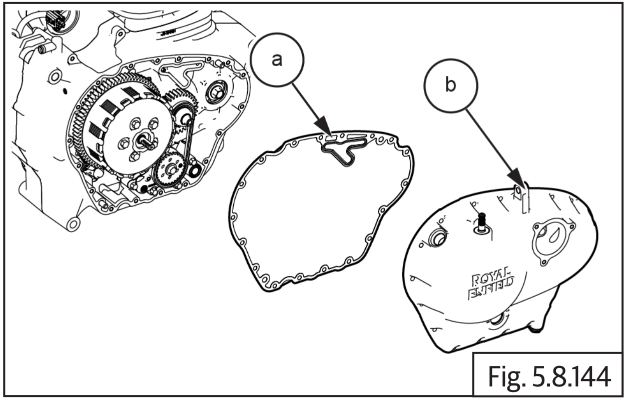


Fig. 5.8.144

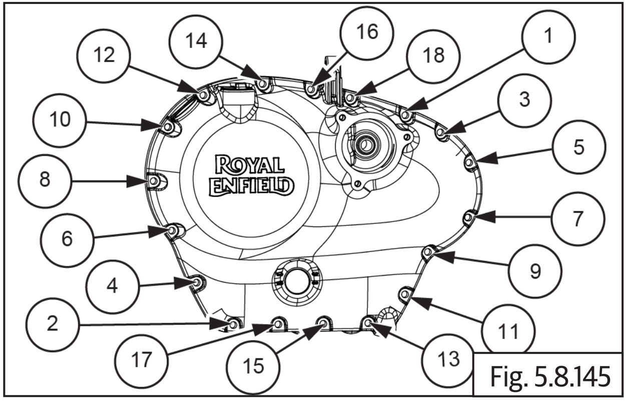


Fig. 5.8.145

NOTE
- *Soak Oil Filter in engine oil before installation*

- Install oil filter **(a)** on the cover RH. The spring in the oil filter should be facing outside.

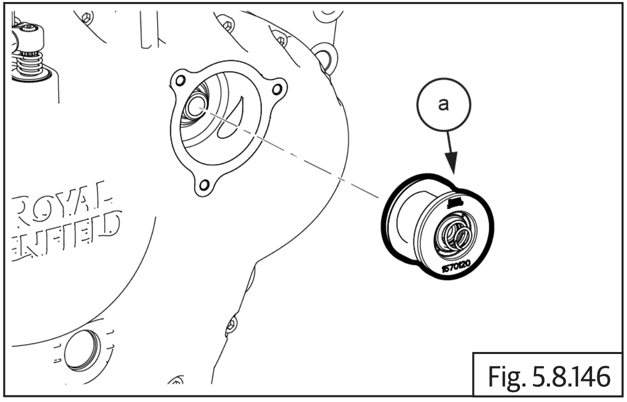


Fig. 5.8.146

- Install O-Ring **(a)** on the oil filter cover **(b).**

NOTE
• *Oil filter O-Ring is one time use only.* **DO NOT** *resuse.*

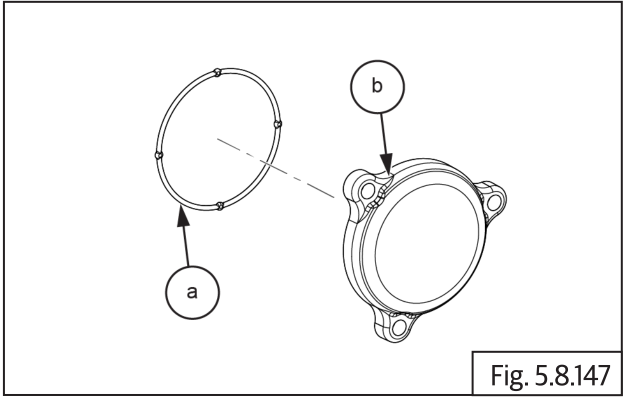


Fig. 5.8.147

- Install oil filter cover **(a)** on the RH cover and thighten 3 Nos **(M6)** bolts.

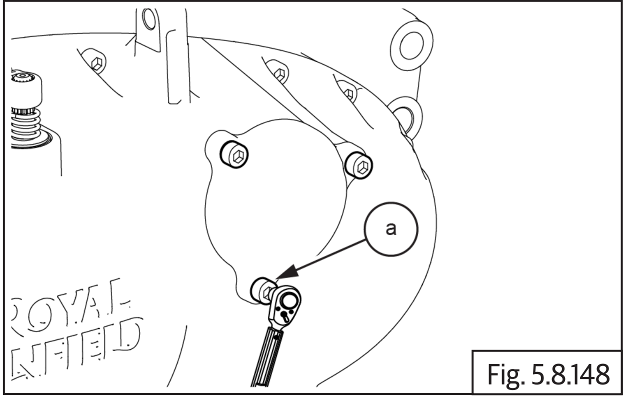


Fig. 5.8.148

🔧	8 mm Socket with Torque Wrench
Torque	10-12 N-m/01.0-1.2 kgf-m

5.8.35. Starter Idler Gear

NOTE
• *Lubricate idler gear shafts with engine oil before installation.*

- Install two starter idler gears **(a)** and **(b)** with shafts on LH crankcase.

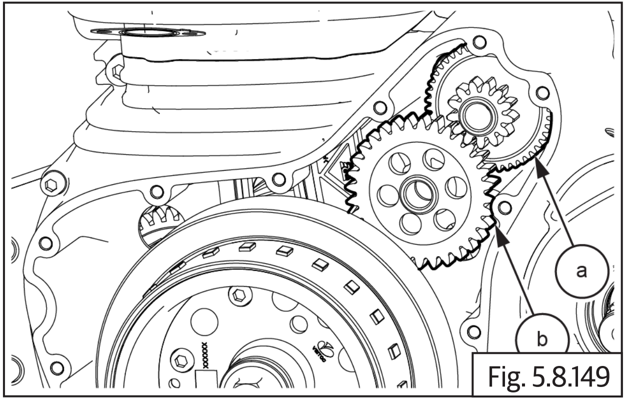


Fig. 5.8.149

- Install collar **(a)** on each shaft.

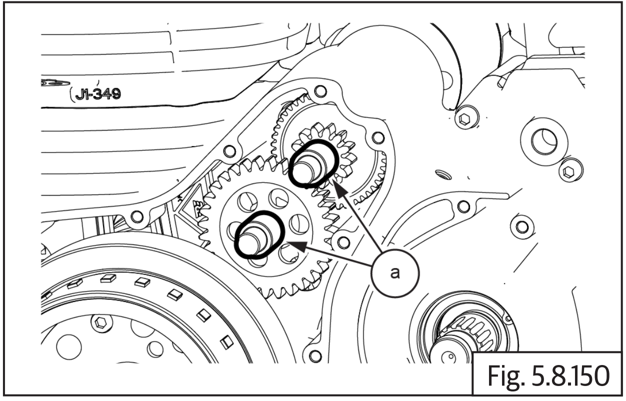


Fig. 5.8.150

5.8.36. Cover LH

- Install dowel pin **(a)** into the grooves provided in the crankcase LH.

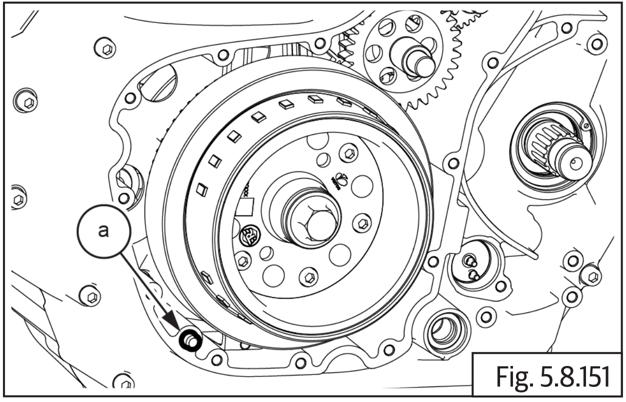


Fig. 5.8.151

- Install new gasket **(a)** into cover LH.

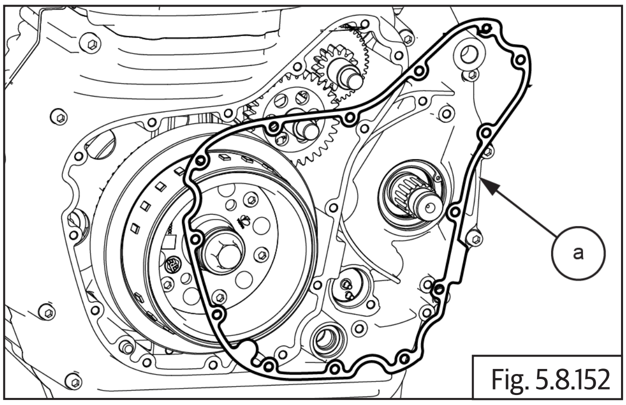


Fig. 5.8.152

- Install magneto using 14 Nos. bolts **(a)** **(M6)** in sequence mentioned below.

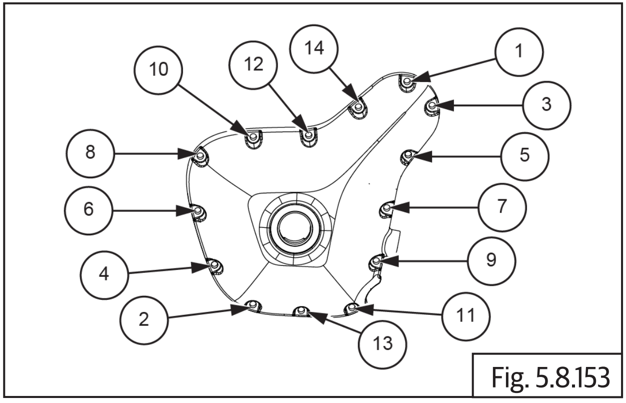


Fig. 5.8.153

	5 mm Socket with Ratchet
Torque	10-12 N-m/01.0-1.2 kgf-m

5.8.37. Gear Position Sensor

> ***NOTE***
>
> - *Apply BONDERITE S-O240 around the O-Ring before installation.*

- Install new O-ring **(a)** over Gear Position Sensor **(b)** on the crankcase using 2 Nos. bolts **(c)** **(M6)**.

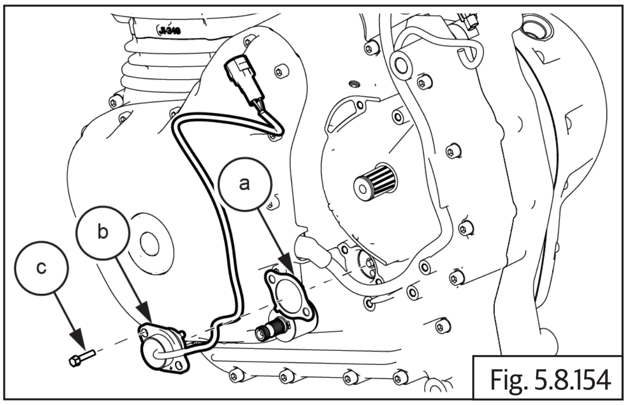


Fig. 5.8.154

	8 mm Socket with Ratchet
Torque	10-12 N-m/01.0-1.2 kgf-m

- Install retainer-Gear Position Sensor Wire **(a)** using 2 nos bolts.

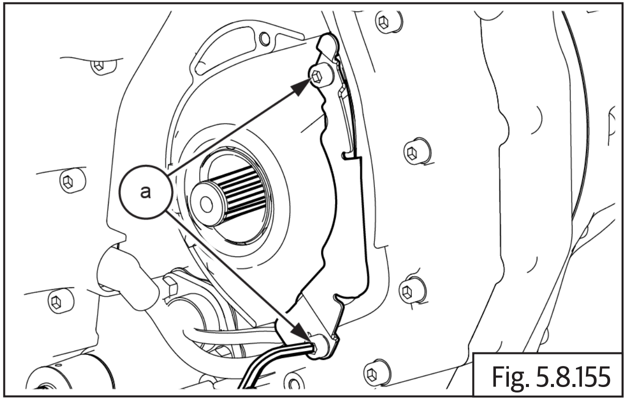


Fig. 5.8.155

	8 mm Socket with Ratchet
Torque	10-12 N-m/01.0-1.2 kgf-m

> ***NOTE***
>
> - *Ensure ACG wire and GPS wire packaged inside the clamp of gear position sensor*

5.8.38. Plug-Crankshaft Hole

- Install Plug crankshaft hole **(a)** along with new O-ring **(a)** in LH cover.

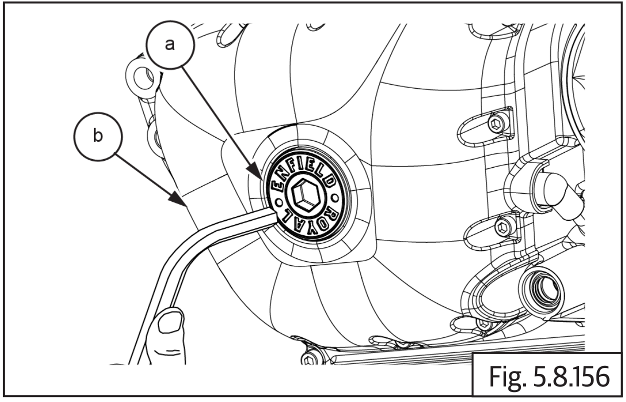


Fig. 5.8.156

🔧	14 mm Allen Socket with Ratchet
Torque	18-22 N-m/1.8-2.2 kgf-m

5.8.39. Starter motor

NOTE
• *Inspect O-Ring for damages. Replace if required.*   • *Apply oil around the O-Ring before installation.*

- Install the starter motor **(a)** using 2 Nos. allen bolts **(M6)**.

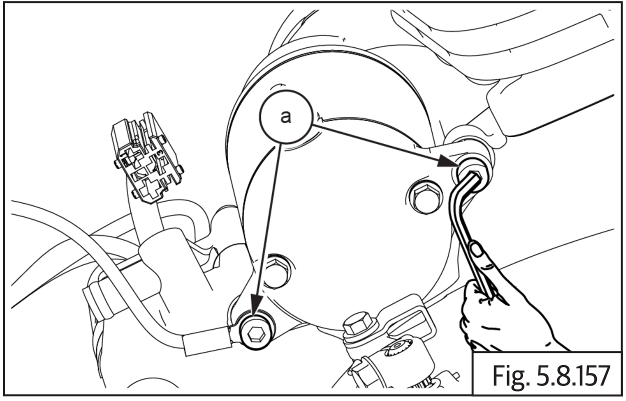


Fig. 5.8.157

🔧	5 mm Socket with Ratchet
Torque	10-12 N-m/01.0-1.2 kgf-m

5.8.40. Oil Strainer

- Apply fresh engine oil and insert oil strainer **(a)** gently till you hear a click sound.

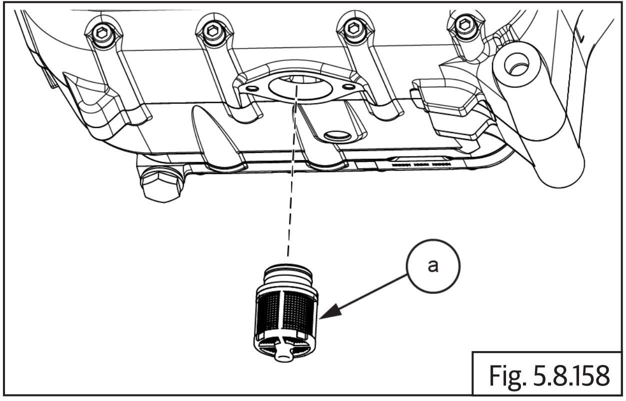


Fig. 5.8.158

- Place new O-Ring **(a)** on the strainer cover **(b)**.

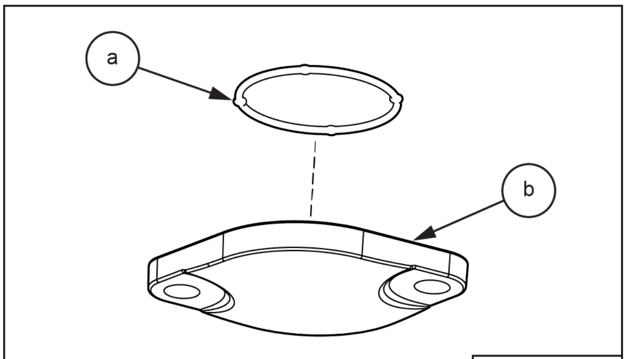


Fig. 5.8.159

NOTE
- *Strainer cap O-Ring is one time use only. DO NOT reuse.* - *Apply engine oil on o-ring before assembly*

- Locate the strainer cover **(a)** and tighten it with 2 Nos **(b)** (**M6**) bolts.

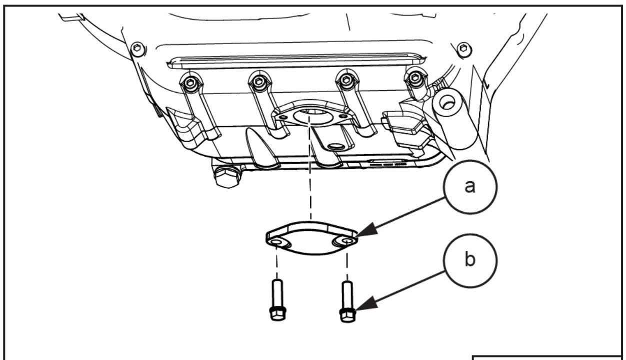


Fig. 5.8.160

Dry Fill	2.5 Liters / 0.55 Imperial gallon
Grade	SAE 15W50 APISL, JASO MA2, SEMI SYNTHETIC

🔧	8 mm Socket with Ratchet
Torque	8-12 N-m/0,8-1.2 kgf-m

- Refill engine oil with recommended quantity.
- Assemble engine oil filler cap **(a)**.

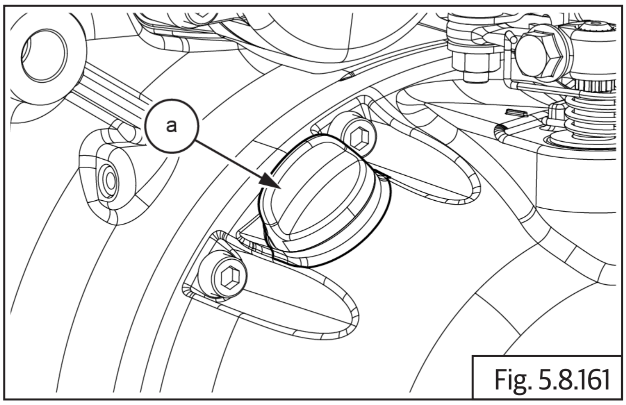


Fig. 5.8.161

- Start and warm up engine for 2 to 3 minutes and then turn it "OFF".
- Check oil level through oil level window.

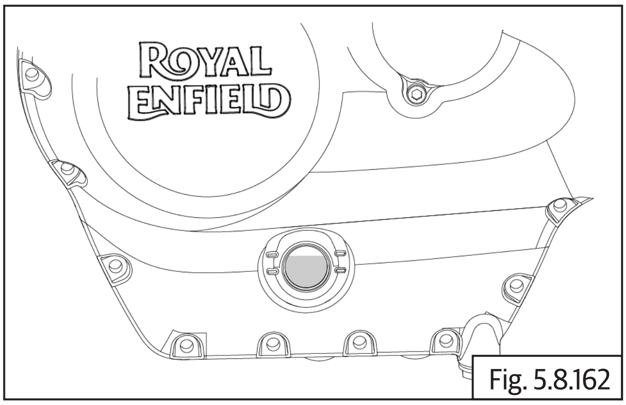


Fig. 5.8.162

5.8.41. Breather Hose

- Install breather hose **(b)** using a circlip **(a)**.

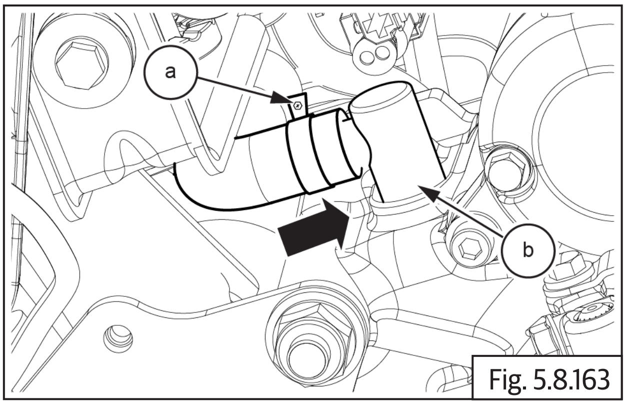


Fig. 5.8.163

🔧	Nose Plier

5.8.42. FD sprocket

- Install the FD sprocket **(a)** along with tab washer and “U” nut **(c)** **(M20)**.

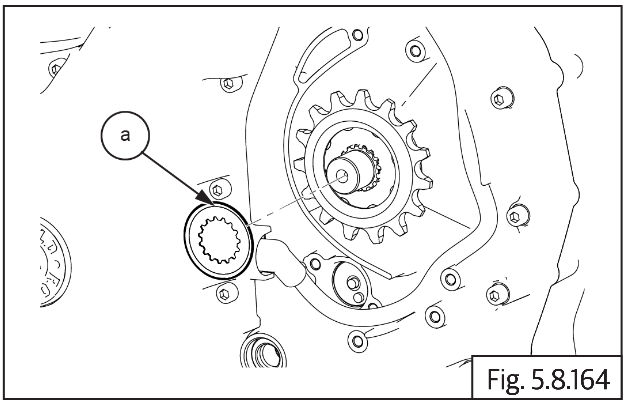


Fig. 5.8.164

- Lock the FD sprocket **(a)** from rotating using special tool **(b)**.

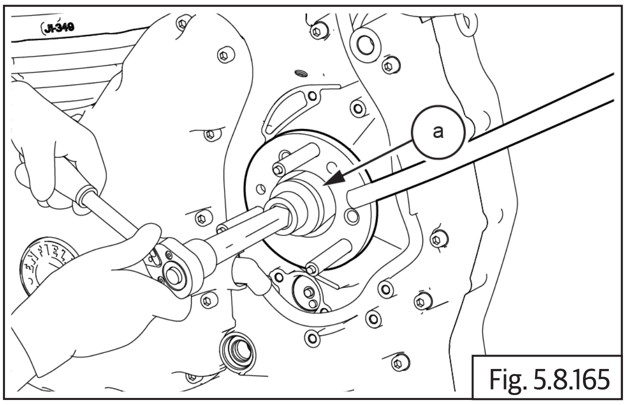
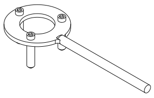


Fig. 5.8.165

SPL 	Part No: ST-27534-2
	Part Name: FD sprocket holder

🔧	30 mm Socket with Ratchet
Torque	130-160 N-m/13.0-16.0 kgf-m

- Lock using tab washer holder **(a)**.

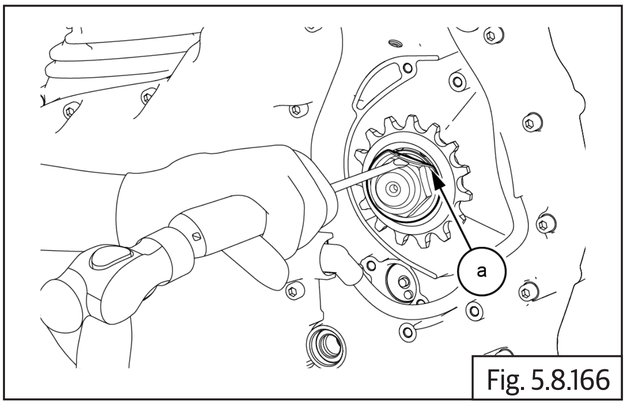


Fig. 5.8.166

🔧	Chisel and Hammer

5.8.43. Throttle Body

- Install throttle body in inlet manifold.

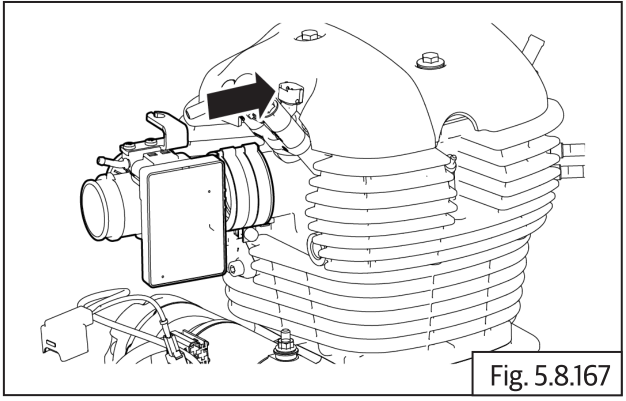


Fig. 5.8.167

- Install Throttle body using 2 Nos. allen bolts **(M5) (a)**.

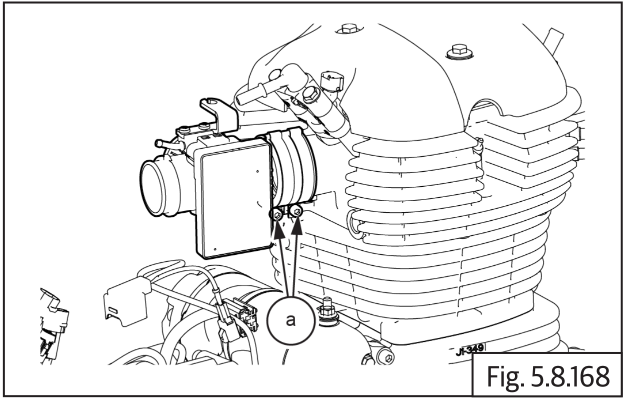


Fig. 5.8.168

🔧	4 mm Allen Socket with Ratchet
Torque	3-7 N-m/0.3-0.7 kgf-m

5.8.44. Engine Oil Temperature/EOT sensor

- Install the EOT sensor **(a)** along with the O-ring using circlip and special tool.

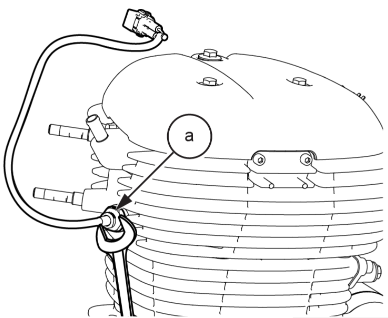


Fig. 5.8.169

🔧	17 mm Open end spanner
Torque	15-20 N-m/1.5-2.0 kgf-m

ENGINE TROUBLESHOOTING

5.9 Engine Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix
Poor/Weak Compression	Spark plug is loose	Spark plug is not tightened to torque	Check and tighten spark plug to specified torque.
		Threads are stripped OR damaged on spark plug OR cylinder head	Inspect spark plug tightening threads in cylinder head for wear-out/damage. Replace cylinder head assembly. Inspect spark plug threads for any damages OR wear-out. Replace spark plug.
	No clearance between rocker arm and valve stem	Tappet is adjusted too tight (Causing valves to be partially open in TDC compression stroke)	Refer tappet adjustment. Adjust valve clearance as per specifications.
	Valve(s) movement sticky in valve guide(s)	Valve stem is partially seized in valve guide	Check valve(s) for free movement in valve guide(s). Replace as required.
		Valve stem(s) bent	
	Valve(s) stuck open after compression stroke (Valve timing)	Sprocket is incorrectly aligned to cam shaft	Check and align sprocket correctly on cam shaft.
		Cam shaft rotation is partially seized (sticky) in cylinder head	Check cam shaft for free movement in cylinder head. Replace as required.
	Cylinder head gasket leakage	Uneven head bolt torque	Remove and inspect cylinder head/ cylinder barrel seating surfaces for warpage, damage, unevenness, etc. Replace cylinder head gasket and tighten cylinder head bolts to specified torque.
		Uneven/damaged seating surface on cylinder head/ cylinder barrel	

Symptom	Possible Cause	Diagnosis	How to Fix
Poor/Weak Compression	Piston rings are worn out	Excessive gap in piston rings at the end in cylinder barrel	Inspect piston rings and cylinder barrel for excessive wear out. Replace piston rings/piston with rings. Replace cylinder barrel assembly if cylinder barrel is worn out.
	Piston scuffed/ partially seized in cylinder barrel	Piston scuffed/damaged/ partially seized in cylinder barrel	Inspect cylinder barrel for damages/heavy scoring and replace piston assembly AND/OR cylinder barrel as required.
Engine Overheating	Oil level is low	External oil leakage	Inspect all joints carefully for oil leaks and rectify.
		Excess oil consumption	Check for smoke through exhaust in hot condition, inspect valve stem seals, valve stem to guide excess clearance, piston rings wear-out, and piston/cylinder barrel wear-out/damage. Repair/replace accordingly.
	Engine oil is contaminated	Non recommend engine oil is used Metal particles found in oil	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Engine oil has lost viscosity	Engine oil is contaminated and too thin	
	Engine oil looks too black/highly viscous	Engine oil is not changed as per recommended maintenance schedule	

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Overheating	Low engine oil pressure	Strainer is blocked	Remove oil sump cover and strainer, Clean/replace oil strainer. Replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
		Poor delivery by oil pump	Check oil pressure, inspect oil pump for internal blocks OR wear out. Clean & replace oil pump as required. Replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Poor cooling of oil	Oil cooler fins are clogged. Oil cooler pipes have internal blocks	Clean oil cooler fins & replace if fins are damaged excessively. Check oil cooler pipes for blocks & clean/replace pipes as required.
	No clearance between rocker arm and valve stem	Tappet(s) adjusted is too tight (Causing valves to be partially open in TDC compression stroke)	Check and adjust tappet clearances to specifications.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Overheating	Partial seizure of Engine internals	Rocker arm(s)is partially seized (sticky) in spindle(s)	Check rocker arm(s) for free movement in spindle(s).
		Cam shaft rotation is partially seized (sticky) in cylinder head	Check cam shaft for free movement in cylinder head.
		Valve stem is partially seized (sticky) in valve guide	Check valve(s) for free movement in valve guide(s).
		Piston is scuffed/damaged/ partially seized in cylinder barrel	Inspect cylinder barrel for damages/heavy scoring and replace piston assembly AND/OR cylinder barrel as required.
		Connecting rod is partially seized in crank shaft assembly	Dismantle engine, inspect all internal parts, replace as required and reassemble engine.
		Journal bearings/crankshaft/ balancer shafts are seized	
	Transmission drag	Bearings/Gear/Bushes in the shaft are seized	Dismantle engine, inspect all internal parts, replace as required and reassemble engine.

Symptom	Possible Cause	Diagnosis	How to Fix
Excessive Engine Oil Consumption/ Smoke (Bluish White)	Excess oil in Engine	Engine oil is filled excessively	Drain and refill oil to correct specifications. Replace oil filter. Inspect and clean air box and breather hoses for excess oil.
	Engine oil is contaminated	Engine oil is NOT as per Royal Enfield recommendation	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Engine oil looks too black/highly viscous	Engine oil is not changed as per recommended maintenance schedule	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Relief valve in oil pump malfunction	Remove and inspect oil pump relief valve	Remove oil pump and clean OR replace the relief valve.
	Valve stem seal failure	Valve stem seal(s) is cracked OR loose in valve guide	Inspect Stem seals; if defective replace full set.
	Valve stem to valve guide clearance is excess	Valve guides worn out excessively	Inspect valve stem guide. If the clearance is out of specification; replace head assembly.
	Valve stem is scuffed/ scored	Valve stem seal(s)is cracked OR worked loose from valve guide	Inspect Stem seals; if defective replace full set.
	Piston rings are stuck in piston ring grooves	Wet/excessive carbon build up in ring grooves in piston/ on rings	Release piston ring(s) carefully from piston ring groove(s), clean and replace with new rings. Inspect cylinder for damages.

Symptom	Possible Cause	Diagnosis	How to Fix
Excessive Engine Oil Consumption/ Smoke (Bluish White)	Piston rings are worn out	Excessive gap in piston rings at the end in cylinder barrel	Inspect piston rings and cylinder barrel for excessive wear out. Replace piston rings/piston with rings. Replace cylinder barrel assembly if cylinder barrel is worn out.
	Piston is seized in cylinder barrel	Piston is scuffed, damaged OR partially seized in cylinder barrel	Inspect cylinder barrel for damages/heavy scoring and replace piston assembly AND/OR cylinder barrel if required.
	Partial seizure of engine internals	Connecting rod is partially seized in crank shaft assembly	Dismantle engine, inspect all internal parts, replace as required and reassemble engine.
		Journal bearings/crankshaft/ balancer shafts are seized	

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Top End	Exhaust gas leak between cylinder head and exhaust pipe	Exhaust pipe(s) flange mounting nuts are loose AND/OR seal is deformed OR damaged	Dismantle exhaust pipe(s) from cylinder head; replace gasket and tighten flange mounting to specified torque.
	Tappet adjuster(s)is worn out	"Elephant foot" on tappet adjuster(s)is worn out/pitted	Inspect “Elephant foot” and replace if worn-out OR damaged.
	Excessive clearance between rocker arm and valve stem	Tappet(s)is adjusted too loose	Check and adjust tappet clearances to specifications.
	Rocker arm(s) movement is sticky	Rocker arm(s) is partially seized (sticky) in spindle(s)	Inspect rocker arm spindle for scoring OR damage. Inspect rocker arm spindle clearance and replace if required.
	Rocker arm(s)has excessive clearance in spindle(s)	Rocker arm(s) and spindle(s) are worn out	Inspect and replace rocker arms set along with spindle(s).
	Excessive wear-out of Camshaft journals	Camshaft journal is partially seized OR scored	Inspect and replace cylinder head.
	Cam chain is making noise	Cam chain/cam chain pads/ cam shaft sprocket is worn-out	Inspect cam shaft sprocket, cam chain, chain pads, cam chain tensioner and replace affected parts.
	Valve springs are damaged	Valve springs are loose OR broken	Inspect valve springs and replace full set.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Top End	Valve stem to valve guide clearance is excess	Valve stem guides are worn out excessively	Inspect valve stem guide. If the clearance is out of specs; replace the head assembly.
	Valve stem(s) is partially seized (sticky) in valve guide(s)	Inspect valve stem and guides for free movement in valve guide(s)	If the movement is not as per specs, replace the valve stem and guide.
	Valve seat insert is loose in cylinder head	Inspect valve seat inserts for damages	Dismantle cylinder head & valves and replace.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Middle	Cam chain tensioner is defective	Cam chain tensioner spring/ cam chain pad are worn-out OR broken	Replace cam chain tensioner pad assembly.
	Piston rings are stuck in piston groove	Wet/excessive carbon is build up in the ring grooves in piston/on rings	Release piston ring(s) carefully from piston ring groove(s), clean and replace with new rings.
	Piston rings are worn out	Excessive gap in piston rings at the end in cylinder barrel	Inspect piston rings and cylinder barrel for excessive wear out. Replace piston rings/piston with rings. Replace cylinder barrel assembly if cylinder barrel is worn out.
	Excessive clearance between Piston and barrel	Inspect Piston to Barrel clearance for given specs	Replace entire set of cylinder piston and barrel assembly.
	Connecting rod small end to piston pin clearance is excess	Remove and inspect if the piston pin is loose OR scored OR seized	Replace the piston pin AND/OR connecting rod as required.
	Connecting rod is bent	Remove and inspect valve timing; check if valve is stuck OR damaged and if the connecting rod is bent OR twisted	Replace the connecting rod AND/ OR stem valve and affected parts.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Bottom	Crankshaft journal bearing is worn-out/ partially seized	Remove and inspect the bearing code and crankshaft. Check for scores OR seizures	Refer the crank shaft journal bearing code selection chart. Check the oil gallery. Replace the journal bearings and crankshaft if required.
	Connecting rod big end journal bearing is worn-out/partially seized	Remove and inspect oil circulation and the connecting rod bigger end bearing	Refer the connecting rod bearing code selection chart. Check and replace the connecting rod big end bearing.
	Balancer shaft journal bearing is worn-out/ partially seized	Remove and inspect the balancer shaft and journal bearing	Refer balancer shaft bearing code selection chart. Check and replace the balancer shaft bearing and replace if defective.
	Clutch slipper spring is deformed OR broken	Remove and inspect clutch slipper spring for breakage	Replace the clutch slipper spring if worn-out.
	Clutch outer hub collar bush/needle bearing is defective	Remove and inspect if the clutch outer hub collar bush/ needle bearing is worn out	Replace the affected parts.
	Clutch friction plate lugs/clutch outer hub slots are defective	Remove and inspect if clutch friction plate lugs/clutch outer hub slots are worn-out OR damaged	Check and replace the friction plates and affected parts.
	Drive shaft bearing is worn out	Remove and inspect for noisy drive shaft bearing OR excess play	Check and replace the bearing/ drive shaft assembly.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Noise Bottom	Drive shaft bush is worn out	Remove and inspect for drive shaft bush wear-out OR excess play	Check and replace the bush and shaft if worn out.
	Counter shaft bearing is worn out	Remove and inspect for the noisy counter shaft bearing	Check and replace the counter shaft bearing and shaft if worn out.
	Counter shaft bush is worn out	Remove and inspect counter shaft bush for any wear-out OR excess play	Check and replace the counter shaft bush and shaft if worn out.
	Excessive clearance between splines and gears	Remove and inspect splines and gears for any wear-out OR excess play	Check and replace the gear splines and gears.

Symptom	Possible Cause	Diagnosis	How to Fix
Engine Vibration	Engine mounting fasteners to main/ cradle frame are loose	Check all mounting fasteners for looseness/stripped OR washed out threads/broken mountings/fasteners	Ensure engine mounting fasteners are tightened at specified torque to the main/cradle frame. Check the mounting for any cracks OR damages. Check if the adjuster and bush are as per specifications.
	Engine steady bracket is loose	Check fasteners for looseness/ stripped/washed out threads/ broken mountings/fasteners	Ensure engine steady bracket mounting is free of cracks. Ensure that fasteners are tightened to main frame to the specified torque.
	Silencer mounting is loose	Inspect silencer (LH/RH) mountings, mounting cub washers and brackets for cracks OR loose ends. Inspect if tightening torque with cylinder head and silencer pipe brackets to frame torque is as per specs	Ensure silencer (LH/RH) mountings points, mounting cub washers and brackets are free of cracks OR loose ends. Tighten all mounting fasteners to specified torque. Ensure exhaust pipe mounting flange nuts are correctly tightened to cylinder head.
	Foot pegs are loose	Check foot peg mounting fasteners for looseness/ stripping/washed out threads/ broken fasteners	Tighten foot pegs to specified torque and replace defective parts.
	Balancer shaft/ crankshaft run-out	Dismantle engine and check balancer shaft for any run out/ bearings damage	Replace affected bearings/balancer shaft.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch is Spongy/Soft	Clutch inner cable is partially damaged	Inspect clutch cable top & bottom ends for damaged inner cable	Replace Clutch cable.
	Clutch has excess free play	Clutch cable free play is more than specs at handle bar end	Adjust clutch free play to 2-3mm.
	Engine oil has lost viscosity	Check if engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Clutch activating lever assembly is loose on clutch shaft	Check if clutch lever clamping bolts are loose	Tighten clamping bolt on clutch lever as per specs.
		Inspect splines on clutch shaft and lever for splines damage/ worn out	Replace clutch lever and shaft.
	Clutch springs are weak	Inspect clutch release springs for pre-setting/length reduction	Inspect clutch springs for correct free length and replace if out of specs.
	Clutch springs are broken	Inspect clutch springs for any damages	Replace clutch springs.
	Clutch friction plates have become soggy	Inspect clutch friction plate material for softness/ damages/puffed up condition	Replace clutch friction plate/steel plates.
	Clutch center/hub is worn out	Inspect clutch center and hub splines area for damages/wear out	Replace clutch assembly.
	Clutch assembly center nut is loose	Inspect if clutch center fixing nut is loose/threads are washed out	Replace nut/main shaft.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch is Hard	Clutch inner cable is stuck/has hard movement in outer cable	Inspect inner clutch cable for free movement in outer cable	Lubricate clutch cable and inspect for free movement. If problem still exists, replace clutch cable.
	No free play in clutch lever at handle bar end	Clutch cable free play is less than specs	Adjust clutch free play to 2-3mm.
	Engine is contaminated	Engine oil is not changed as per recommended maintenance schedule OR Engine oil is NOT as per Royal Enfield recommendation	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Excess Oil in Engine	Engine oil is filled excessively	Drain and refill oil to correct specifications.
	Clutch lever movement is sticky in cover RH	Check free movement of clutch shaft in cover RH	Remove clutch shaft from cover RH, inspect, lubricate and reassemble.
		Check if clutch shaft is seized in cover RH	Replace clutch shaft in cover RH.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch Slip	Clutch has excess free play	Inspect clutch cable top & bottom ends for frayed strands of the inner cable	Replace clutch cab;e if damaged. Adjust clutch free play to 2-3mm.
	Clutch lever movement is sticky in cover RH	Check free movement of clutch shaft in cover RH	Remove clutch shaft from cover RH, inspect, lubricate and reassemble.
		Check if clutch shaft is seized in cover RH	Replace clutch shaft in cover RH.
	Clutch springs are weak	Inspect clutch release springs for presetting/length reduction	Replace if out of specs.
	Clutch springs are broken	Inspect clutch springs for any damages	Replace clutch springs.
	Clutch friction plates have become soggy	Inspect clutch friction plate material for softness/ damages/puffed up condition	Replace clutch friction plate/steel plates.
	Clutch center/hub is worn out	Inspect clutch center and hub spline area for damages/wear out	Replace clutch assembly.
	Clutch assembly center nut is loose	Inspect if clutch center fixing nut is loose/threads are washed out	Replace nut/main shaft.

Symptom	Possible Cause	Diagnosis	How to Fix
Clutch juddering	Clutch cable is brittle	Inspect clutch cable top & bottom ends for frayed strands of the inner cable	Replace clutch cable.
	Clutch lever movement is sticky in cover RH	Check free movement of clutch shaft in cover RH	Remove clutch shaft from cover RH, inspect, lubricate and reassemble.
		Check if clutch shaft is seized in cover RH	Replace clutch shaft in cover RH.
	Uneven wear of clutch friction plates	Friction plates OR steel plates are worn-out, warped OR dragging	Remove clutch friction and steel plates. Inspect, lubricate and reassemble. Replace if necessary.
	Clutch steel plate movement on clutch hub is abrupt		
	Clutch steel plate warped	Check if steel plate is warped OR worn-out	Remove clutch steel plates, inspect, lubricate and reassemble. Replace if necessary.
	Clutch release spring is sticky	Inspect if the clutch release spring is not releasing properly	Remove, inspect and replace.
Noise in Clutch	Clutch Spring is broken	Inspect if the clutch is also broken	Replace the spring and clutch if required.
	Clutch outer hub collar bush/needle bearing is worn-out	Inspect if Clutch outer hub collar bush/needle bearing for damages	Replace hub collar bush AND/OR needle bearing.
	Clutch friction plate lugs/clutch outer hub slots are worn out	Inspect clutch friction plate and outer hub for damages	Replace Clutch friction plate lugs AND/OR clutch outer hub.
Down-Shift/Up-Shift Travel Is Excessive	Gear link is defective	Inspect if the gear link is worn out	Remove, lubricate link and reassemble. Replace if necessary.

Symptom	Possible Cause	Diagnosis	How to Fix
Gear is Hard to Shift	Gear shift stopper is defective	Inspect gear shift stopper roller for wear-out/damage	Remove and lubricate shifter and reassemble. Replace if necessary.
	Gear shift stopper spring is defective	Inspect gear shift spring for preset/breakage	Replace the spring.
Gear is under engaged condition	Shifter fork movement is sticky	Inspect if shifter fork has sticky movement in spindle/ selector drum	Replace the shifter fork.
Gear Engagement is Hard	Oil level is low/engine oil has lost viscosity	Engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Excessive clutch free play	Clutch cable free play is more than specs at handle bar end	Adjust free play and replace clutch cable if necessary.
	Gear shaft is bent	Inspect if the gear shaft is sticky OR bent	Replace gear shaft.
	Shifter fork movement and selector drum are sticky	Inspect shifter fork free movement in selector drum	Replace the selector drum.
	Sliding gear movement on counter-shaft/drive shaft is sticky	Inspect if gear sliding is sticky	Replace sliding gears on counter shaft and drive shaft.
	Gear shift stopper movement is sticky	Inspect if shifter fork stopper is worn-out	Remove, lubricate and reassemble shifter fork. Replace if necessary.
	Gear shift shaft is bent/stuck	Remove and inspect shaft run-out	Replace gear shaft.

Symptom	Possible Cause	Diagnosis	How to Fix
Gear Engages and Slips	Gear shift stopper is worn-out	Inspect gear shift stopper	Remove, lubricate shifter and reassemble. Replace if necessary.
	Gear shift stopper spring is broken	Inspect gear shift spring for preset/breakage	Check and Replace the spring.
	Sliding gear dogs are worn-out	Inspect sliding gear dogs	Remove and replace if necessary.
Gear is not Engaging	Engine oil has lost viscosity	Engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Gear teeth are broken	Inspect gear teeth	Remove, inspect and replace gear and affected parts.
	Gear shift stopper is jammed	Inspect the movement of the stopper	Remove, inspect and replace the stopper id necessary.
	Selector fork is jammed on spindle	Remove and check the fork in the drum	Check, lubricate and reassemble OR replace if required.
	Selector fork is jammed in selector drum	Check for free traveling of the fork in the selector drum	Replace the drum and affected parts.
	Gear shift shaft is bent/stuck	Dismantle and check the run-out	Replace the gear selector shaft.
Gear Lever is not Returning After Shifting	Gear shift shaft spring is broken	Check operation of gear selector shaft spring AND/OR lock	Remove and replace the spring.
	Gear shift shaft is bent/stuck	Inspect gear shift shaft guide movement	Replace gear shift shaft and affected parts.

Symptom	Possible Cause	Diagnosis	How to Fix
Noise in Gear Box	Engine oil has lost viscosity	Engine oil is contaminated and too thin	Drain oil, replace oil filter and fill fresh engine oil as per Royal Enfield recommendation.
	Gear teeth are broken	Inspect gear teeth	Remove, inspect and replace gear and affected parts.
	Drive shaft bearing is worn-out	Check the bearing sound and wear-out	Dismantle, inspect the drive shaft bearing and replace.
	Drive shaft bush is worn out	Check the bush play and seating	Remove, inspect and replace drive shaft push.
	Counter shaft bearing is worn out	Check if the counter shaft bearing has excess play	Remove, inspect and replace counter shaft bearing and shaft if required.
	Counter shaft bush is worn out	Check if the counter shaft bush is worn-out OR has excess play	Remove, inspect and replace counter shaft bush and shaft if required.
	Excessive clearance between splines and gears	Check if clearance is as per specifications	Remove, inspect and replace the affected parts.

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CHASSIS

6.CHASSIS

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CONTROL CABLES

AIR FILTER BOX ASSEMBLY

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6.1. Air Filter Assembly

Dismantling

6.1.1. Air Filter Element

CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Ensure ignition switch and engine stop switch are in OFF position.
- Remove the following parts:
  - Side panel LH
- Gently support air filter element cover and remove 3 Nos. pan head screws **(a)** from air filter box assembly.

NOTE

- *DO NOT tap or apply excessive force on the screws.*

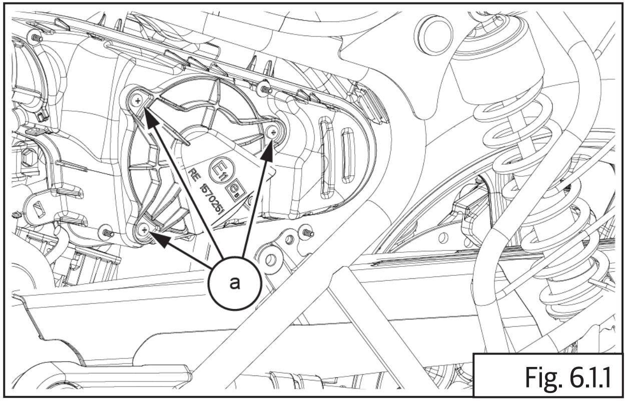

Fig. 6.1.1

Phillips screw driver

- Remove bolts **(a)** and air filter element cover **(b)** from air filter box assembly.

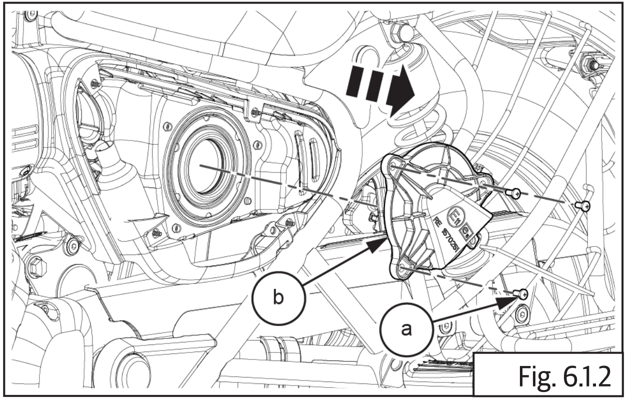

Fig. 6.1.2

- Remove air filter element **(a)** from air filter box assembly.

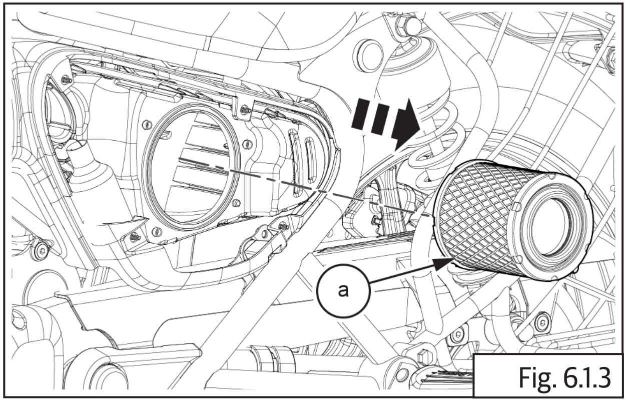

Fig. 6.1.3

6.1.2. Air Filter Box

- Ensure ignition switch and engine stop switch are in OFF position.
- Remove the following parts:
  - Side panel LH
  - Pillion seat
  - Rider seat
- Remove 2 Nos. Hex Bolt **(M6)** **(a)** and **(b)** from the air filter box top.

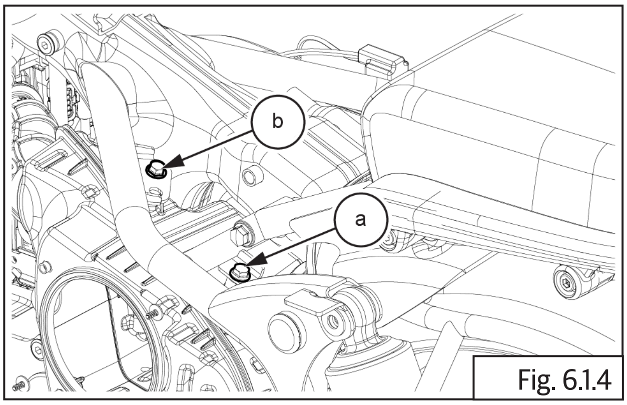

Fig. 6.1.4

10 mm Socket with Ratchet

- Remove 1 No. Allen bolt (a) from the throttle body **(b)**.

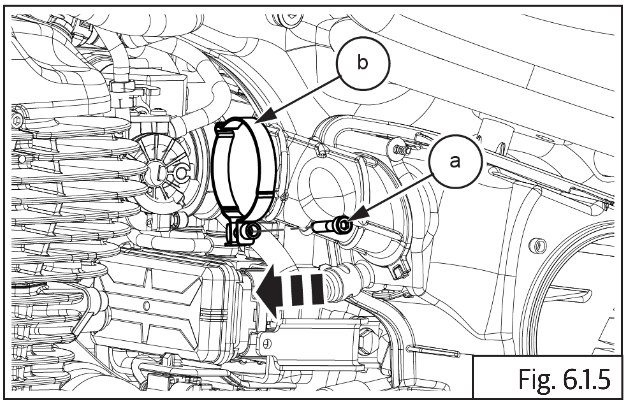

Fig. 6.1.5

	4mm Allen Socket and Ratchet

- Remove the breather hose clips **(a)** and **(b)** and disconnect the breather hoses.

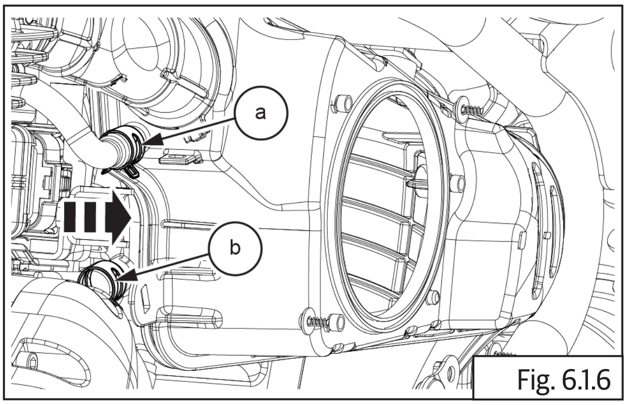

Fig. 6.1.6

	Nose Plier

- Remove air filter box **(a)**.

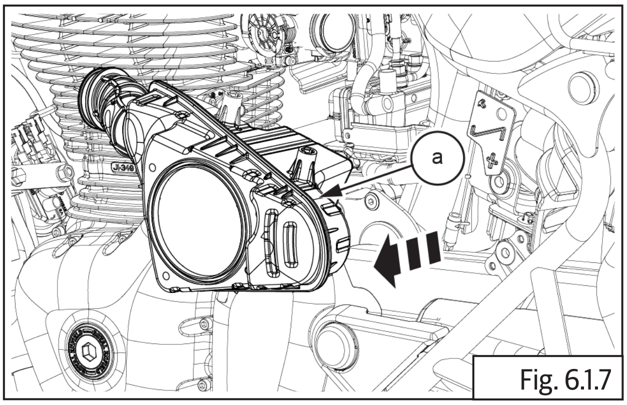

Fig. 6.1.7

Inspection

- Inspect air filter box assembly for any damages or cracks.
- Inspect air intake bellows for any damages, cracks and/or brittleness of the bellows.
- Inspect rubber seals, hoses for cuts, cracks or damages. Replace seals and rubber parts whenever they are removed.
- Inspect air filter element carefully for any deformation, damages, heavy clogging with dirt, soggy condition, and/or foreign particles embedded in the element. Replace if any of these conditions are observed.

Clean

- Clean air filter element **(a)** after first 500 Kms (300 Miles) and later based on the peroidic maintenance schedule OR more frequently if motorcycle is used in dusty/off-road conditions.
- Gently tap filter element with minimum force to dislodge heavy/embedded dust particles.
- Using low pressure compressed air, blow air from out side to inner side to remove fine dust particles.

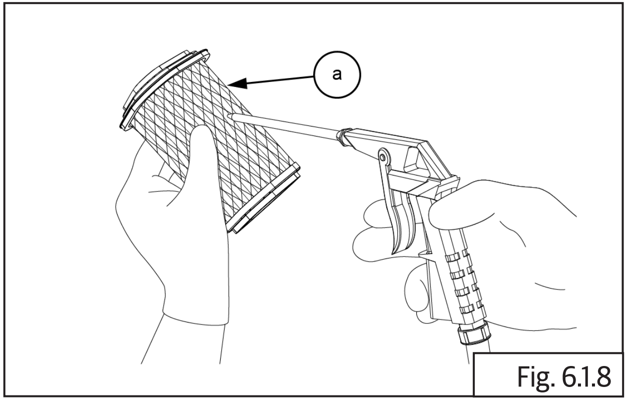

Fig. 6.1.8

	Air gun

⚠ CAUTION

DO NOT wash the element in water, gasoline or any solvents.

- Clean the air filter housing internals, with a soft damp cloth to remove dust.

Replace

- Replace all O-rings, rubber beadings, seals, gaskets, rubber parts etc., whenever air filter assembly is serviced.
- Replace air filter element every 20,000 Kms 12,000 Miles) or earlier if motorcycle is used in dusty/off road conditions.

Assembly

6.1.3. Air Filter Box Assembly

- Install the air filter box **(a)** in the frame.

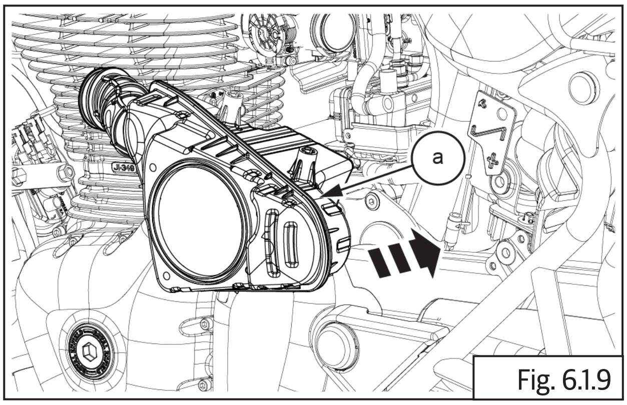

Fig. 6.1.9

- Locate and tighten mounting bolts **(a)** and **(b)** **(M6X20)** in the top of the air filter box.

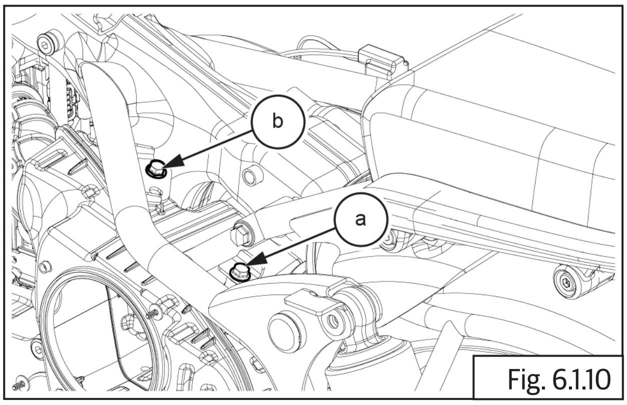

Fig. 6.1.10

🔧	10 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Locate air filter bellow at throttle body **(b)** end and tighten 1 No allen bolt **(a)**.

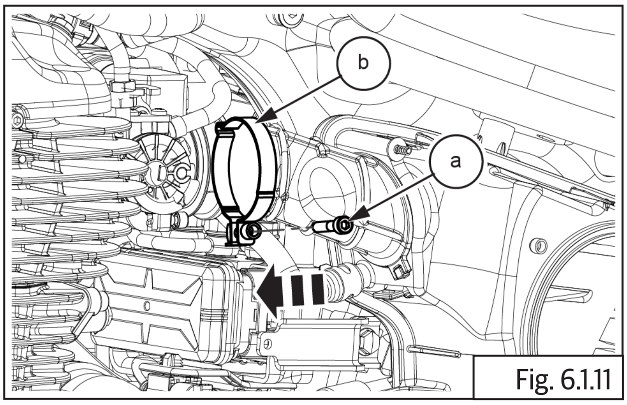

Fig. 6.1.11

🔧	4mm Allen Socket with Ratchet

6.1.4. Air Filter Element

- The filter element **(a)** has one end open and other end closed. Insert closed end of the filter element into the air filter box assembly correctly such that open end is facing outside.

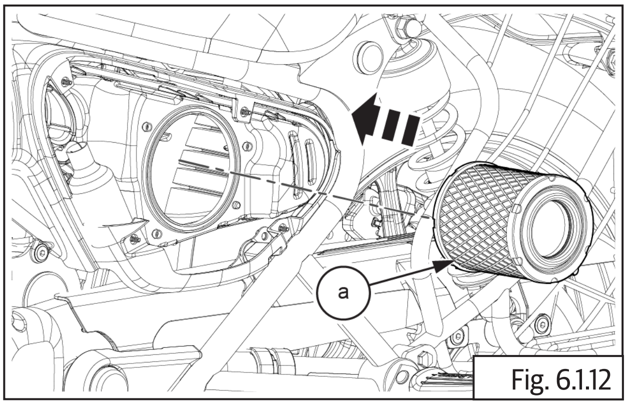

Fig. 6.1.12

- Locate element cover **(a)** on the air filter box assembly. Locate the grove in the cover **(b)** to be aligned properly to peg **(c)**.

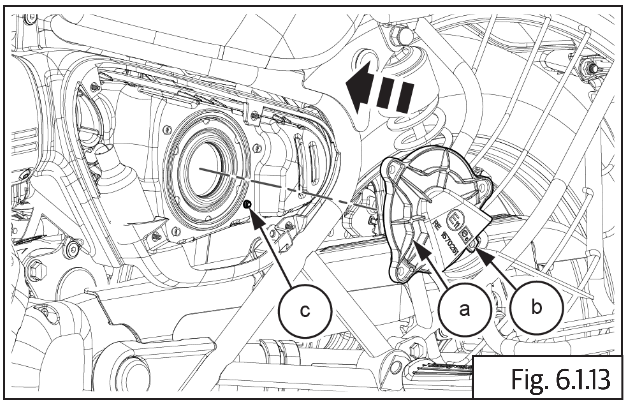

Fig. 6.1.13

- Install 3 Nos. pan head screw **(a)** on air filter cover.

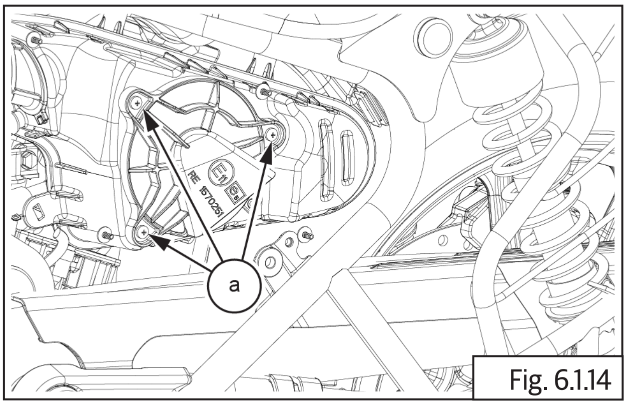

Fig. 6.1.14

🔧	Phillips Screw driver

CONTROL CABLES

Control Cables

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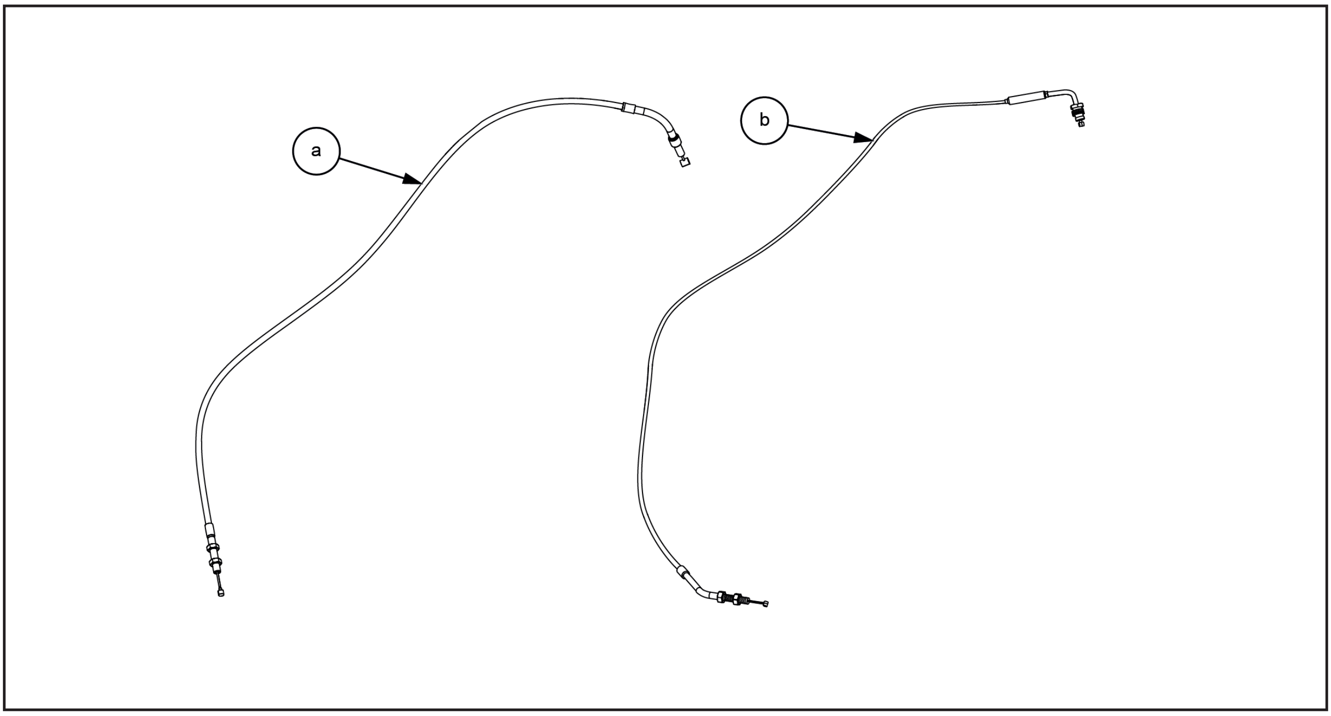
6.2 Control Cables

Clutch Cable



Item No.	Description	Quantity
a	Clutch Cable	1
b	Throttle cable assembly	1

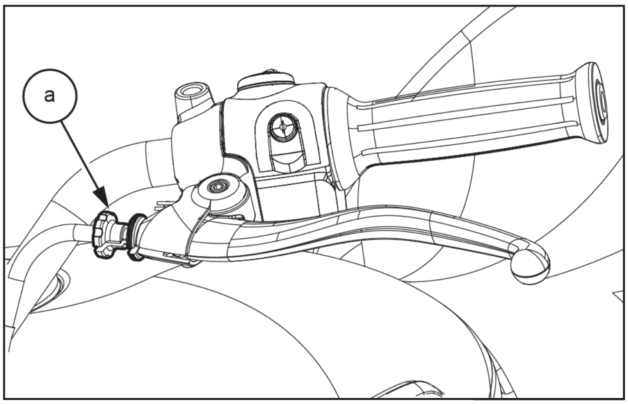
Dismantling

6.2.1. Clutch Cable

Cover RH End

⚠ CAUTION
Ensure the motorcycle is upright on a firm and flat surface.

- Ensure ignition switch and engine stop switch are in OFF position.
- Loosen lock nut and ensure adjuster **(a)** at the handlebar end is fully turned into the bracket LH to increase cable play.



- Loosen outer locknut **(M8) (a)** completely on the clutch cable adjuster at RH cover end and push clutch cable **(b)** into cable guide in cover RH to increase the free play of the inner cable.

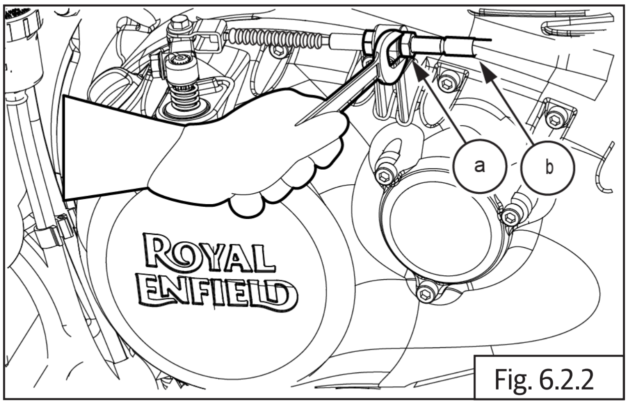


Fig. 6.2.2

	12 mm Double end spanner

- Gently push inner cable **(a)** into clevis **(b)** in clutch shaft **(c)** and remove cable through the slot in the clevis.

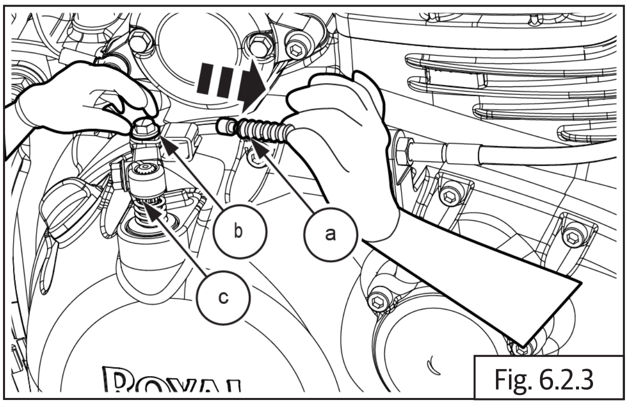


Fig. 6.2.3

- Remove protective rubber boot **(a)** from clutch cable **(b)**.

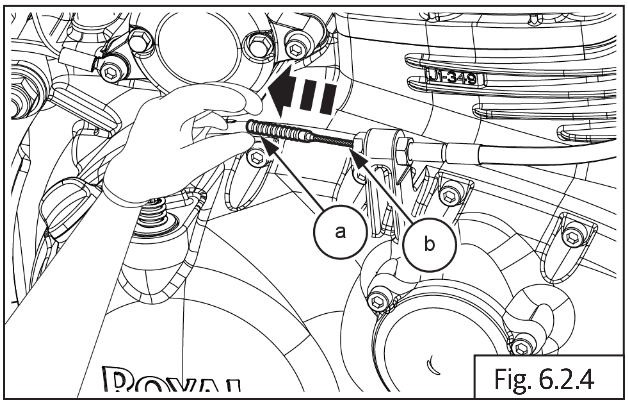


Fig. 6.2.4

- Loosen adjuster nut **(a)** completely from the clutch cable and remove.

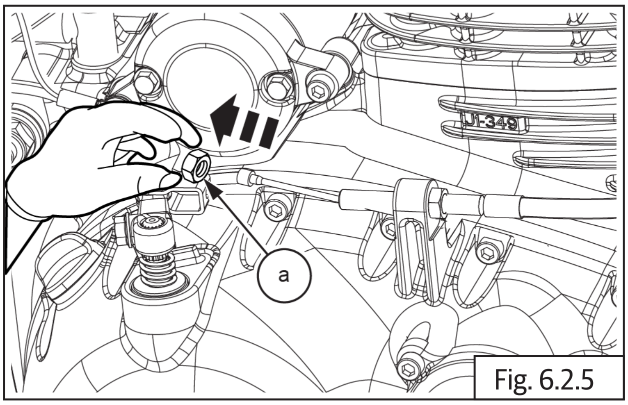


Fig. 6.2.5

- Gently pull out clutch cable assembly **(a)** from the cable guide **(b)** in cover RH assembly.

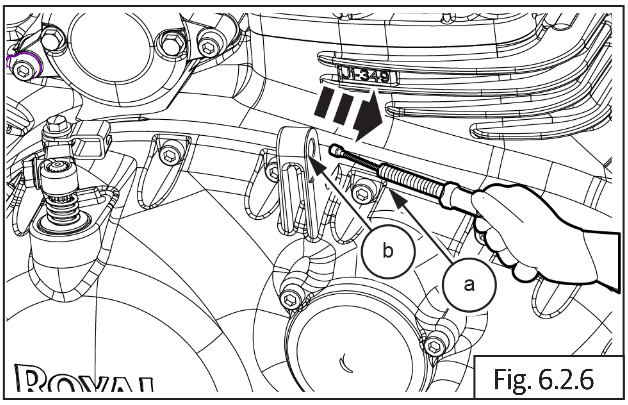


Fig. 6.2.6

Handlebar End

- Ensure the slot in the adjuster **(a)** and locknut **(b)** are aligned with the slot in the clutch bracket.

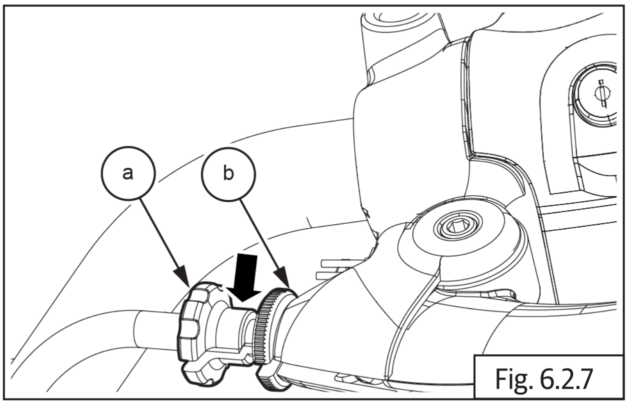


Fig. 6.2.7

- Gently pull out the outer cable **(a)** from the adjuster. Rotate and align adjuster with slot in clutch bracket and release inner cable from lever eyelet.

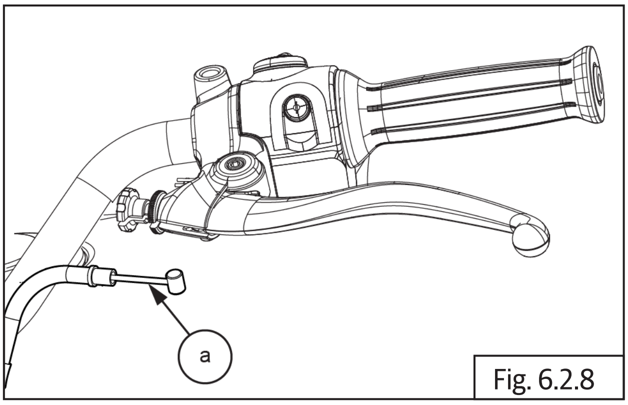


Fig. 6.2.8

- Remove clutch cable from motorcycle.

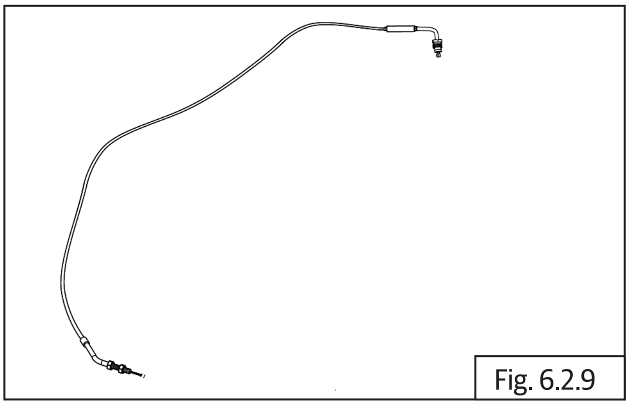


Fig. 6.2.9

6.2.2. Throttle Cable

Throttle Body End

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Ensure Ignition switch and Engine stop switch are in OFF position.
- Remove side panel LH (Section 6.7.1).
- Remove rider seat (Section 6.7.2).
- Loosen fuel tank assembly mountings (Section 7.1.1) and carefully slide and lift fuel tank up to access 2 clips holding the throttle cables to frame on RH side.
- Loosen 2 Nos. Hex nuts **(M6)** **(a)** fully on top of throttle cable bracket **(b)** to increase inner cable **(c)** free play.

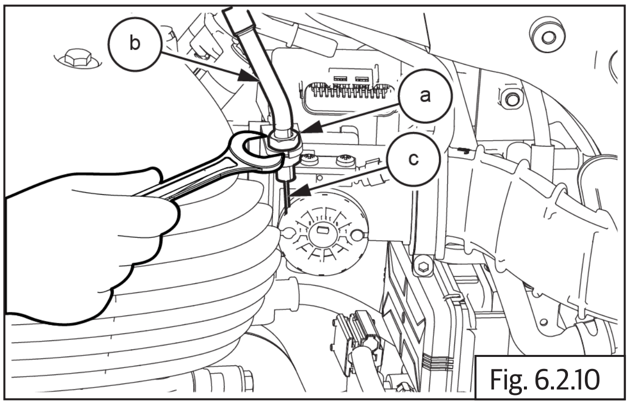


Fig. 6.2.10

10 mm Double end spanner

- Push cable adjusters fully into the bracket and loosen the 2 inner hex nuts **(a)** **(M6)** on the throttle cable adjusters.
- Ensure both inner nuts are free from the adjusters and gently pull out the adjuster of the inside cable till it is out of the bracket and slide the inner cable out through the slot in the bracket.

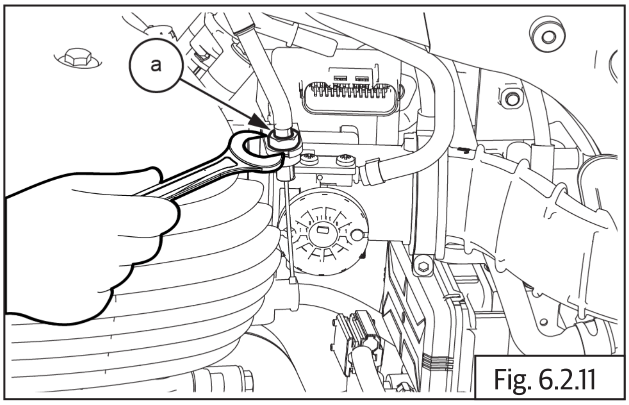
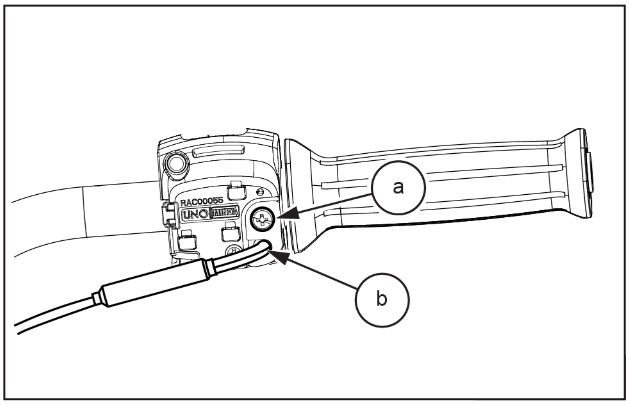


Fig. 6.2.11

Handlebar End

- Loosen screw **(a)** on the cable and rotate the clip **(b)** holding throttle cable to throttle rotor housing.



🔧	Phillips screw driver

- Loosen and remove 2 Nos. Phillips head screws **(a)** from the bottom of the throttle rotor housing **(b)** and separate the halves.

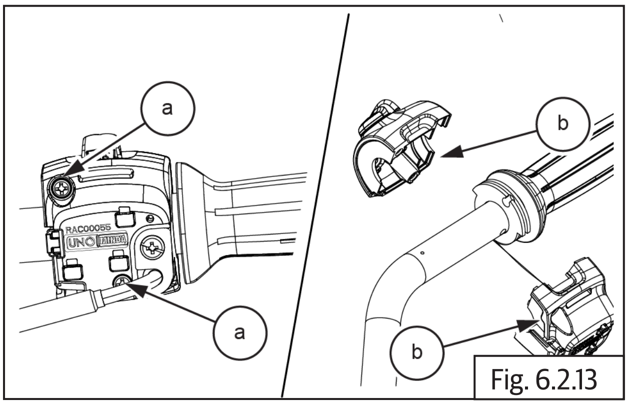


Fig. 6.2.13

🔧	Phillips screw driver

- Gently pull up the inner cable **(a)** from the slot in the throttle rotor **(b)**, rotate and ensure it is aligned to the slot in the throttle rotor grip and remove.

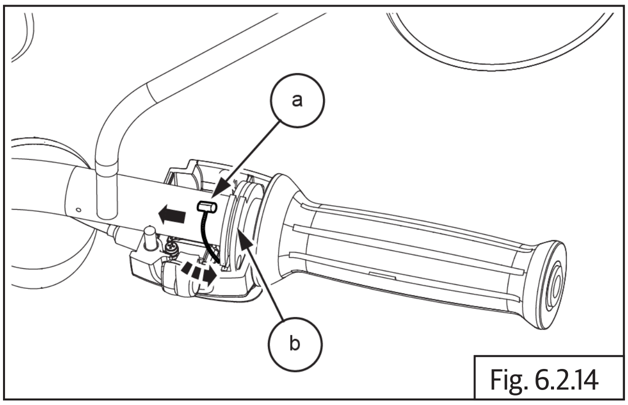


Fig. 6.2.14

- Loosen and remove Allen bolt **(a)** and remove the clamp **(b)**.

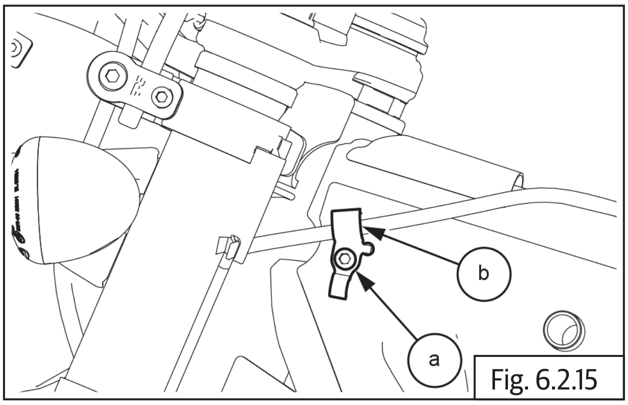


Fig. 6.2.15

- Remove the throttle cable.

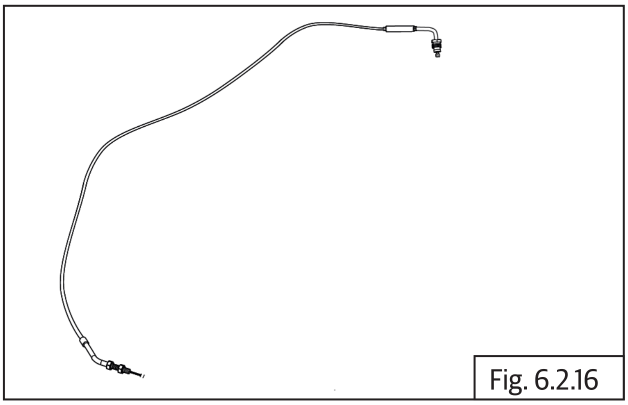


Fig. 6.2.16

Inspection

Cables

- Clean and inspect inner cables top and bottom ends for frayed and/or broken strands.

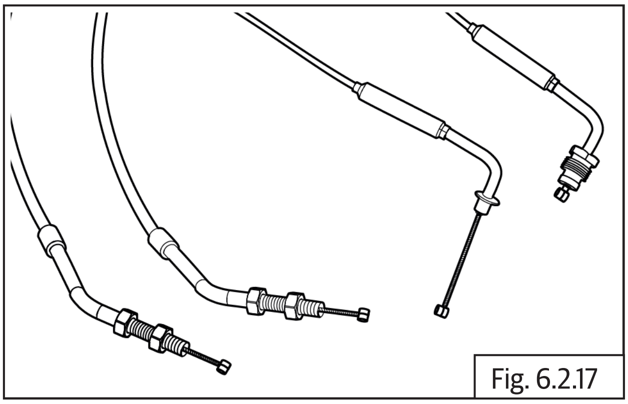


Fig. 6.2.17

- Clean and inspect outer cables for brittleness, damages and/or cracks.

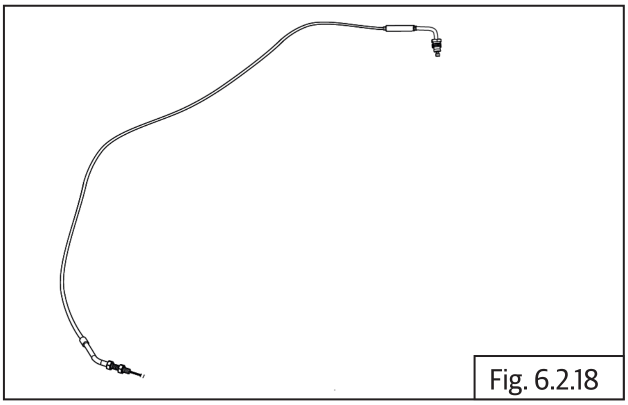


Fig. 6.2.18

- Inspect the cable adjuster threads and hex nuts for any wear out and/or damage.
- Check free movement of the inner cables in the outer cables and no stickiness.
- Replace control cables as per the recommendations in the maintenance chart.

⚠ **CAUTION**

DO NOT wash control cables, especially inner cables, using any solvents since it will damage the protective layer inside the control cables.

Do not lubricate inner cable by spraying any lubricants into the outer cable.

Do not roll the cables into a tight wind for storing after removal. Store them as straight as possible to avoid damage to the inner layer/cable.

Use a soft cloth with a mild cleaning agent if necessary, to wipe off the dirt, grease or grime on the outer cables.

Clutch Lever Bracket Adjusting Screw And Clutch Lever

- Inspect the cable seating area in the adjuster on clutch lever bracket for any damages/cracks.
- Inspect the threads of the adjuster and the clutch lever bracket for any damages, threads wear out.

Throttle Rotor, Grip and Housing on Handlebar RH

- Inspect throttle rotor grip for any damages and/or cracks.
- Inspect throttle rotor for any damages/wear out.
- Inspect cable seating eyelets in the throttle rotor for any damages, fraying etc.
- Inspect the throttle rotor movement slots in the top and bottom housing for any damages/wear out.

Assembly

6.2.3. Throttle Cable

- Route the cable between the top yoke and frame head tube on the LH side under fuel tank.

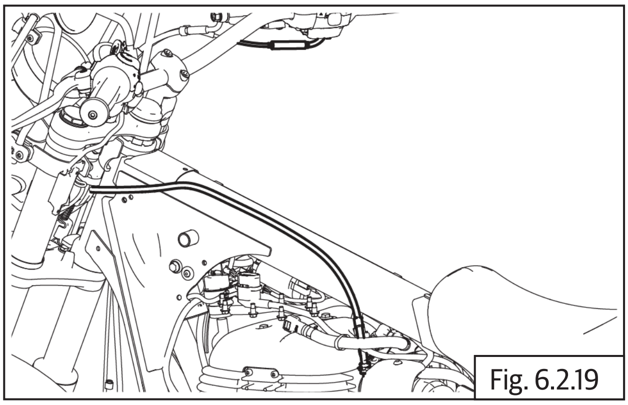


Fig. 6.2.19

- Locate grooves provided on the **(a)**. Route the cable trough the groove **(b)** in the frame.

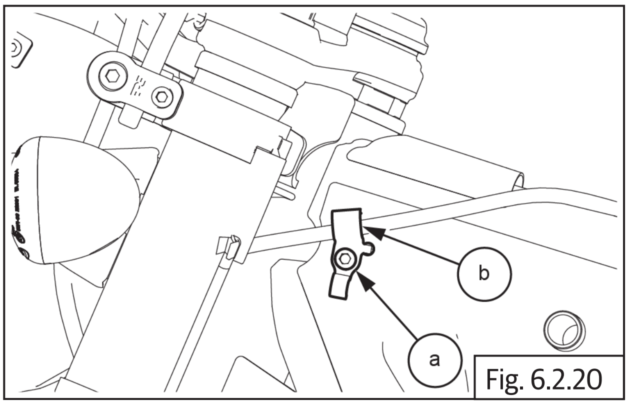


Fig. 6.2.20

Handlebar End

- Lubricate throttle rotor grip inside with general purpose grease and assemble on handlebar RH.
- Ensure the cable slots on the rotor are facing above for correct and ease of assembly of inner cables.

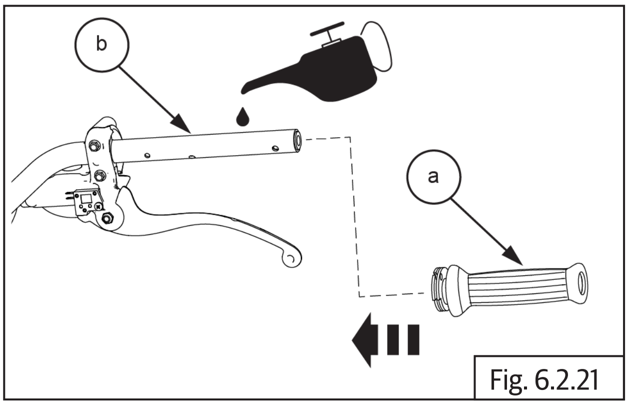


Fig. 6.2.21

- Ensure the adjusters on cable is set at their center for finer adjustments later.
- Insert throttle cable **(a)** into the hole of the throttle rotor housing and locate inner cable in the eyelet on the throttle rotor.
- Align inner cable to the slot in the rotor **(b)**, rotate and ensure proper routing of the inner cable in the slot in throttle rotor.

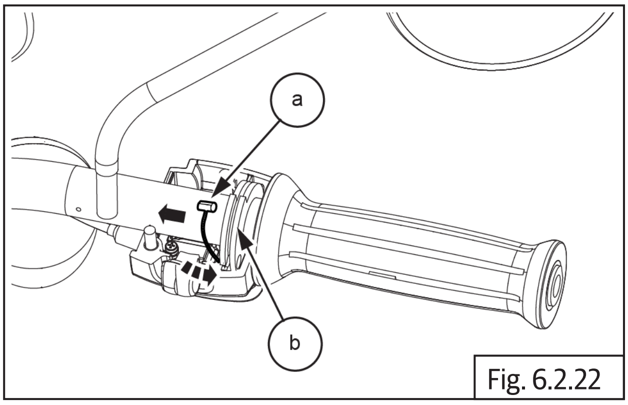


Fig. 6.2.22

- Locate and tighten screw **(a)** over plate **(b)**.

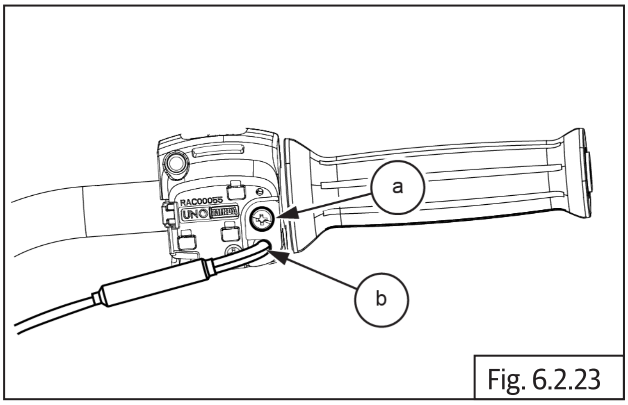


Fig. 6.2.23

	Phillips screw driver

Throttle Body End

- Insert throttle cable **(a)** into the slot in the bracket in the throttle body and ensure the adjuster is fully into the bracket on throttle body.

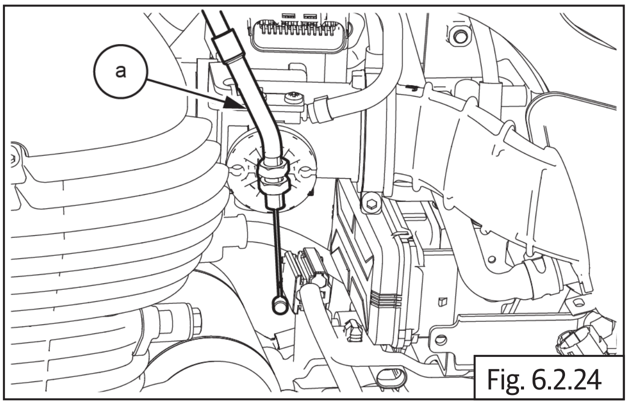


Fig. 6.2.24

- Assemble lock nut **(a)** on the inner cable.
- Position inner cable to the slot of the rotor on throttle body, insert inner cable into the eyelet and route the cable in the groove in the rotor of the throttle body.

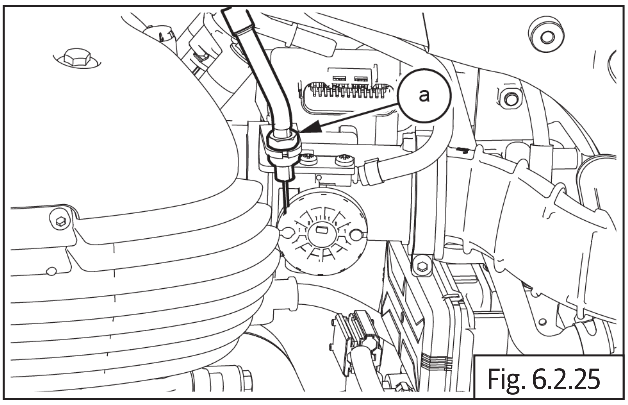


Fig. 6.2.25

- Ensure inner cables is seated properly in the eyelets at throttle body end and handlebar end. Gently rotate throttle rotor at handlebar and ensure they are operating properly.

- Tighten the checknut **(a)** sufficiently.

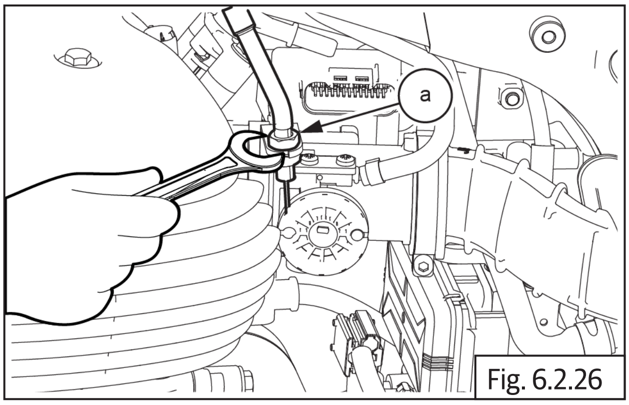


Fig. 6.2.26

🔧	12 mm Open end spanner

6.2.4. Throttle Cables Free Play Adjustment

- Gently pull adjusters out of the bracket on throttle body end till the inner cables have **NO SLACK**.
- Tighten the outside nuts on the adjusters till they are resting against the bracket on throttle body.
- Hold handlebar straight and check for free rotation of **3 to 4 mm**. (The rotor on the throttle body should not rotate).

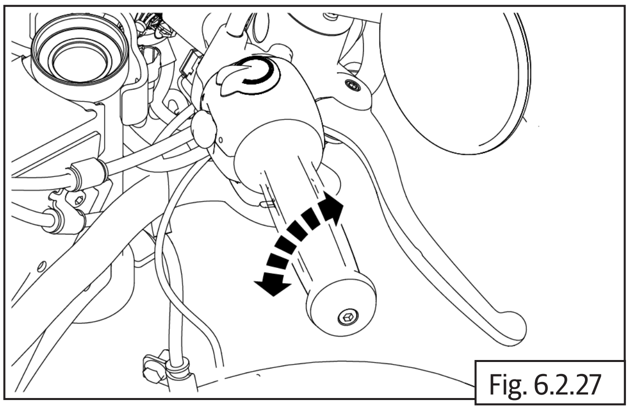


Fig. 6.2.27

- Loosen/Tighten the outer nuts to achieve the correct free play.
- Check both cables are correctly positioned and clamped to the frame, turn handlebar to both left and right sides to ensure the free play is maintained.
- Tighten inner lock nuts on the adjusters till they are firmly locked on the inside of the bracket.

NOTE

- *To carry out finer adjustments to maintain the free play, turn the adjusters on the cables at the handlebar end, in or out.*

- Assemble fuel tank assembly (section 7.1.15).

6.2.5. Clutch Cable

Handlebar End

- Ensure adjuster **(a)** on lever bracket LH **(b)** is in midway position and the slot in the adjuster is correctly aligned to the slot in the lever bracket LH.

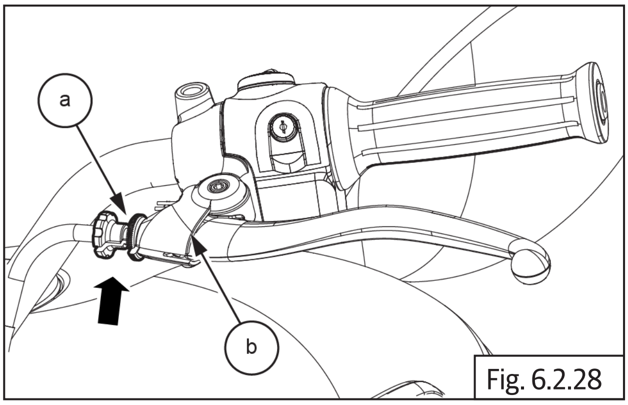


Fig. 6.2.28

- Locate inner cable into the eyelet on clutch lever and ensure it is aligned.
- Route inner cable **(b)** into the slot in the clutch bracket and adjuster and lock the outer cable **(a)** into adjuster.

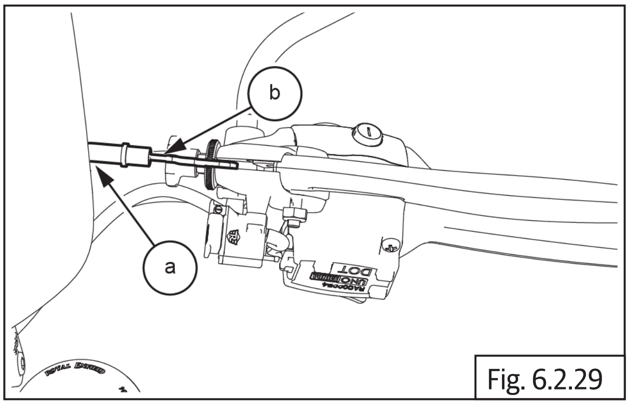


Fig. 6.2.29

- Route clutch cable between headlamp holder LH and frame towards the RH side.

Clutch cover End

- Insert inner cable into the cable guide **(b)** in clutch cover assembly and ensure the adjuster **(a)** is fully inside the guide in clutch cover assembly.

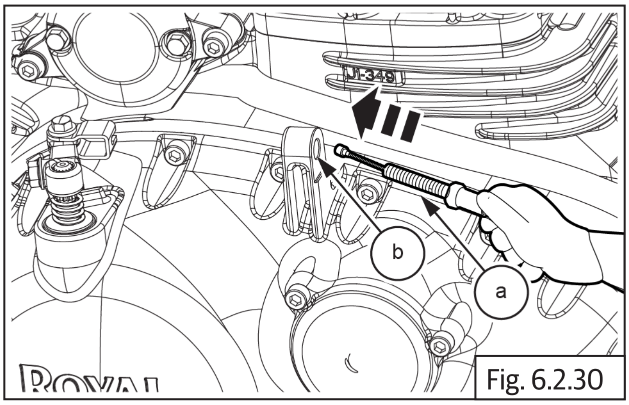


Fig. 6.2.30

- Assemble adjuster nut **(a)** on the adjuster and tighten by a few threads.

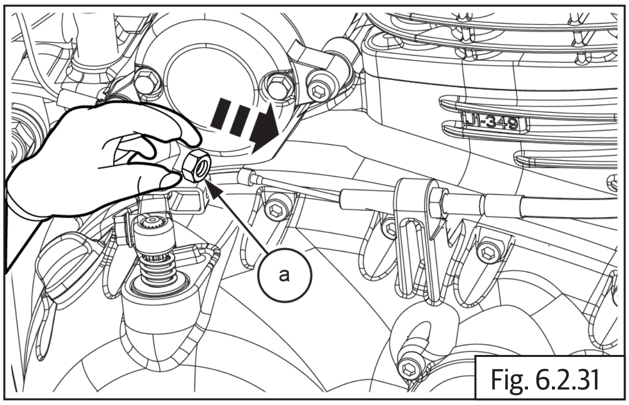


Fig. 6.2.31

- Assemble protective rubber boot **(a)** on clutch cable inner **(b)**.

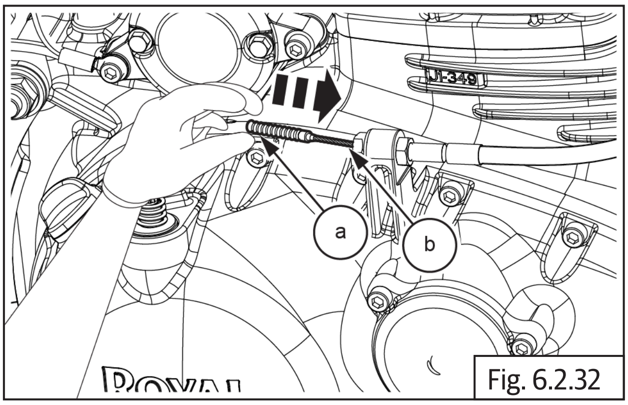


Fig. 6.2.32

- Gently locate inner cable **(a)** into clevis **(b)** in clutch actuator shaft **(c)**.

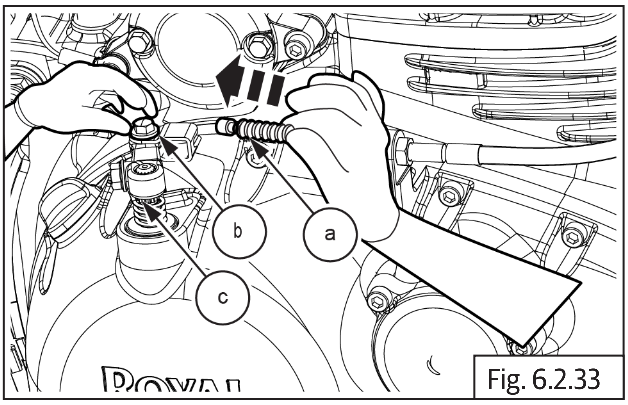


Fig. 6.2.33

Clutch Cable Free Play Adjustment

- Loosen adjuster nuts **(a)** completely in clutch cable **(b)**.

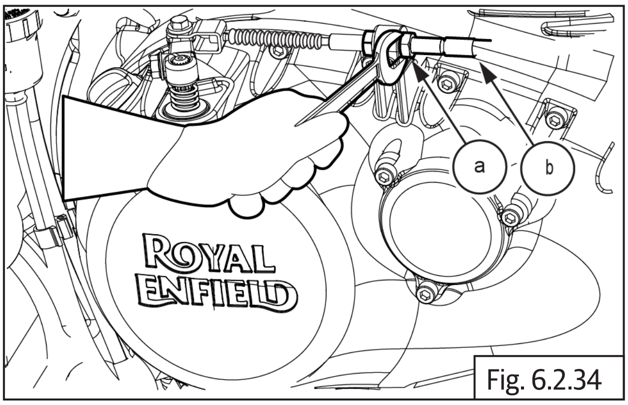


Fig. 6.2.34

🔧	12 mm Double end spanner

- Tighten adjuster at lever end fully and unwind 4 full turns.

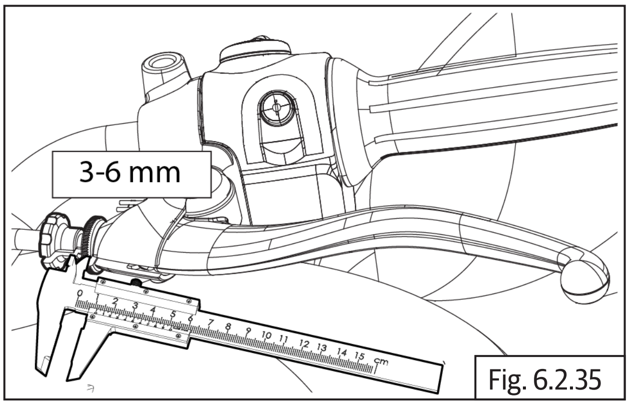


Fig. 6.2.35

- Tighten adjuster nuts **(a)** at clutch cable **(b)** to give zero free play.

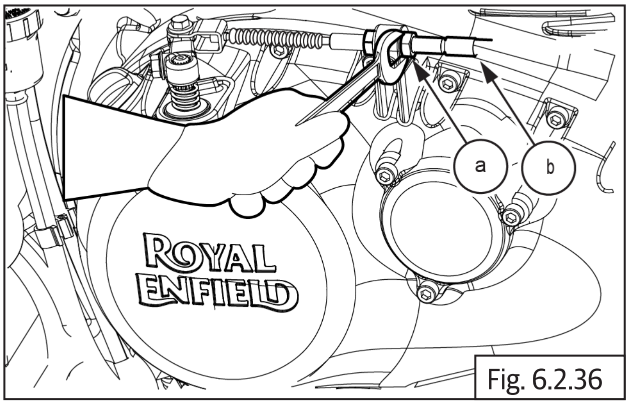


Fig. 6.2.36

- Set steering to fulll left position Actuate lever 3 times, adjust hand adjuster on clutch lever to give a free play of 10-12mm. Tighten lock nut

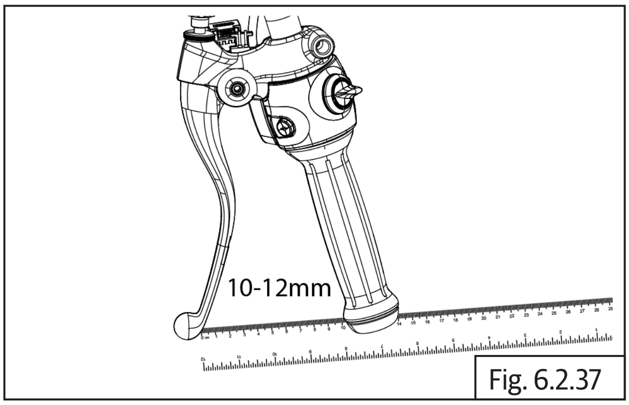


Fig. 6.2.37

- Check the gap between adjuster and checknut to be 3-6mm.

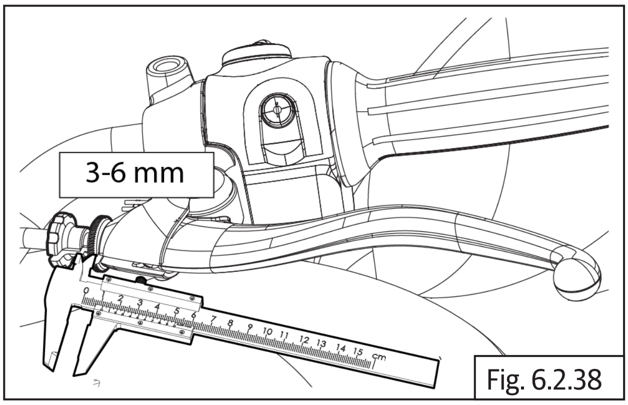


Fig. 6.2.38

- Keep handlebar and straight position. Actuate clutch lever 3 imes and check for free play 10-16mm.

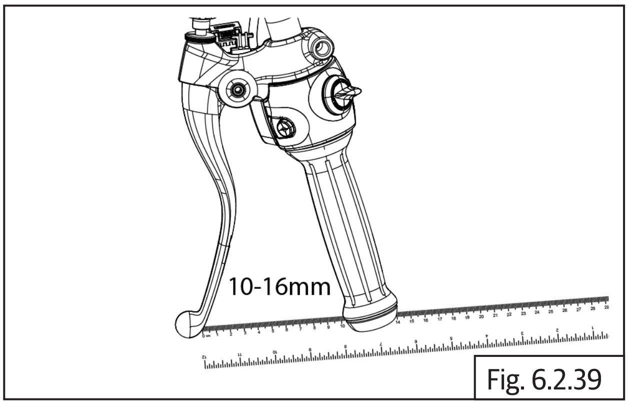


Fig. 6.2.39

- Tighten checknuts to specified torque.

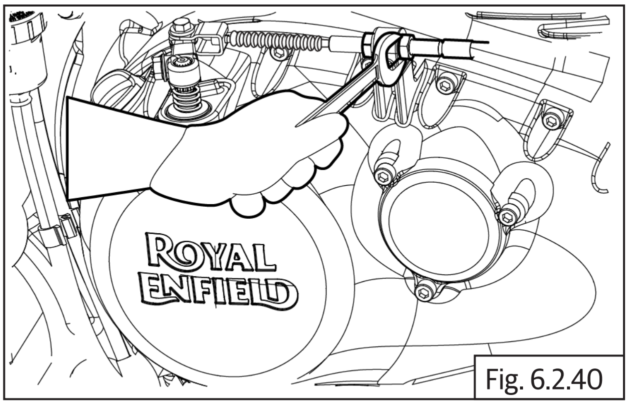


Fig. 6.2.40

🔧	12 mm Open End Spanner
Torque	10-12 N-m/1.0-1.2 kgf-m

- Ensure arm clutch release has positive free lay (more than 0 mm) in steering left positionby hand feel.

Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Clutch lever movement not smooth	Clutch lever operation at handlebar end is sticky	Clutch lever, bracket and pivot screw at handlebar end is dry without lubrication/excessive dirt accumulation	Clean and lubricate clutch lever, bracket and pivot screw at handlebar end	
	Clutch lever excessive movement in handlebar bracket LH	Clutch lever mounting hole is out of shape/fixing bolt worn-out	Check and replace clutch lever bracket assembly	
	Inner cable movement sticky in outer cable	Inner cable strands broken and jammed inside outer cable/clutch lever bracket	Check and replace clutch cable	
		Teflon tube inside outer cable torn/damaged	Check and replace clutch cable	
	Clutch shaft movement sticky in cover RH	Poor/no lubrication of the clutch shaft in cover RH/ uneven wear-out of clutch shaft/cover RH	Check and replace clutch shaft/cover RH	
	Clutch plates movement in clutch housing is sticky	Clutch plates/clutch housing damaged	Check and replace clutch plates/clutch assembly	
Clutch operation hard	Clutch lever movement in bracket hard	Clutch lever, bracket and pivot screw at handlebar end is dry without lubrication/excessive dirt accumulation	Clean and lubricate clutch lever, bracket and pivot screw at handlebar end	
	Inner cable movement sticky in outer cable	Inner cable strands broken and jammed inside outer cable/clutch lever bracket	Check and replace clutch cable	
		Teflon tube inside outer cable torn/damaged	Check and replace clutch cable	
	Clutch shaft movement hard in cover RH	Poor/no lubrication of the clutch shaft in cover RH/ uneven wear-out of clutch shaft/cover RH	Check and replace clutch shaft/cover RH	
	Clutch plates burnt and hard	Clutch plates burnt/hard/ clutch housing damaged	Check and replace clutch plates/clutch assembly	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Throttle rotor movement sticky/ opening hard	Throttle cables are stuck between frame and fuel tank	Throttle cables stuck/ jammed between frame and fuel tank	Check cable routing and proper strapping to frame	
	Throttle rotor movement in housing is sticky	Throttle rotor area in the housing is dry/heavy dirt accumulation	Check and lubricate throttle rotor and housing in handlebar	
	Throttle rotor cable seating area damaged	The eyelets in the throttle rotor are damaged/inner cable eyelets not seating correctly in the rotor eyelets	Check and replace throttle cables/throttle rotor	
	Inner cables movement sticky in outer cable	Throttle cables inner strands broken	Check and replace throttle cables	
		Teflon coating in between inner/outer throttle cables damaged		

HANDLEBAR

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6.3. Handlebar Dismantling

6.3.1. Aggregates of Handlebar

Parts to be removed before dismantling

- Throttle cable
- Clutch cable
- Brake master cylinder
- Electrical connectors of LH and RH switch cubes
- Cable routing straps
- USB Socket

6.3.2. Mirrors

- Loosen hex nut **(a)** and rotate rear view mirror LH in clockwise direction.

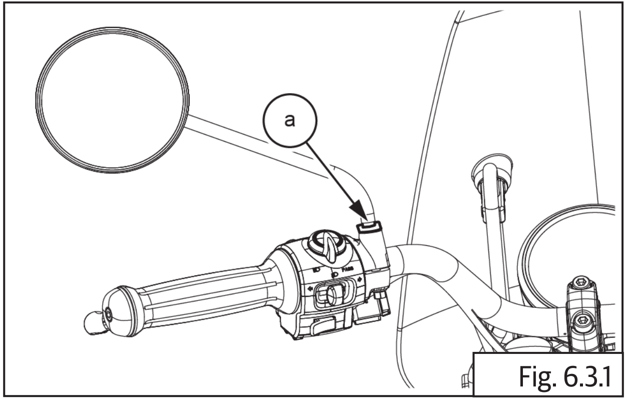

Fig. 6.3.1

🔧	14 mm open end spanner

- Loosen hex nut **(a)** and rotate rear view mirror RH in anticlockwise direction.

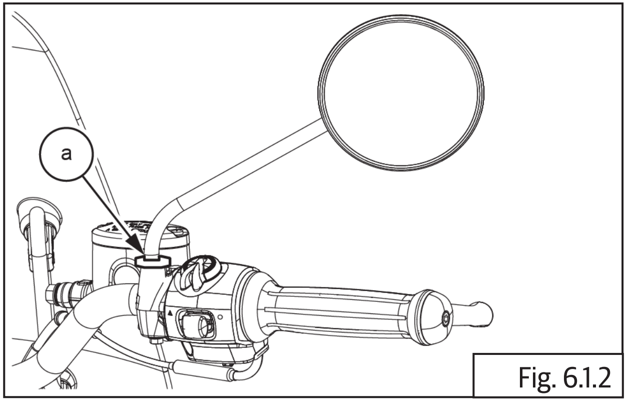

Fig. 6.1.2

🔧	14 mm open end spanner

6.3.3. Bar End

- Loosen and remove allen bolt **(M6) (a)** along with bar end **(b)** from LH and RH of the handlebar

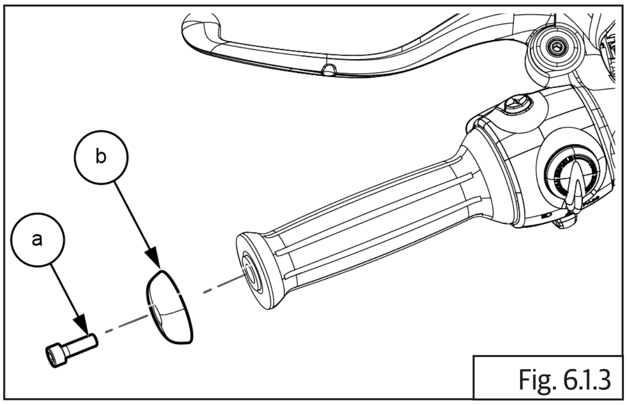

Fig. 6.1.3

🔧	5 mm Allen socket with Ratchet

6.3.4. LH Switch Assembly

- Disconnect wires from clutch switch **(a)**

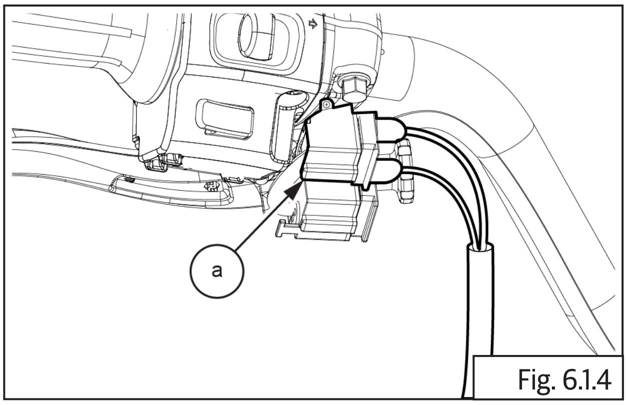

Fig. 6.1.4

- Loosen and remove 2 Nos. Philips head screw **(a)** to remove the USB port **(b)**.

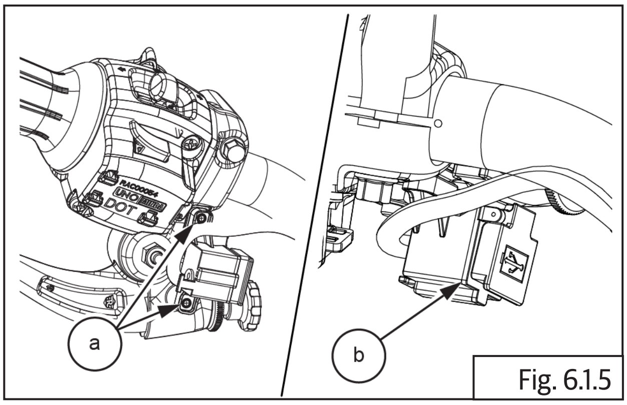

Fig. 6.1.5

🔧	Phillips screw driver

- Loosen and remove 1 nos. Philips head screw **(a)** to remove the clutch switch.

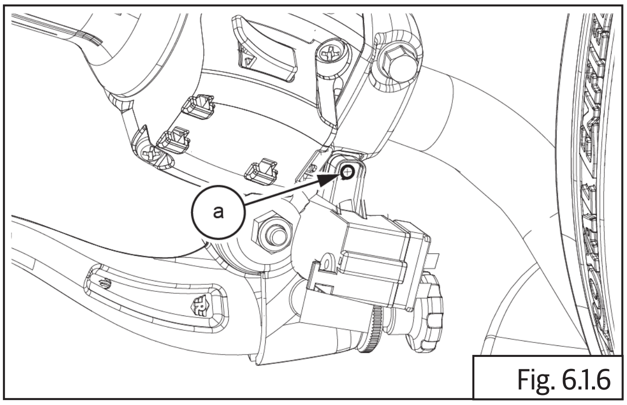

Fig. 6.1.6

- Loosen and remove 2 nos. Philips head screw **(a)** from the switch cube assembly.

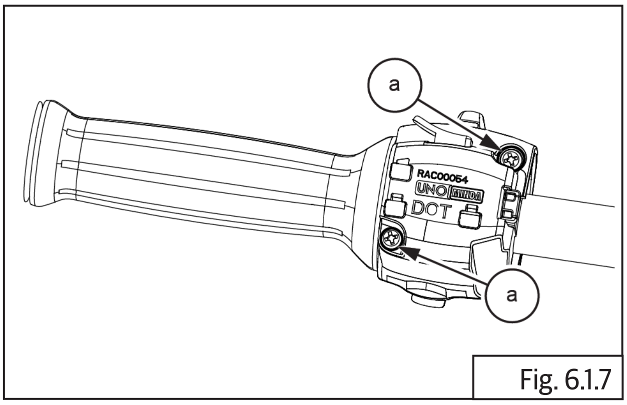

Fig. 6.1.7

- Gently separate the top and bottom of the module to remove from handlebar LH.

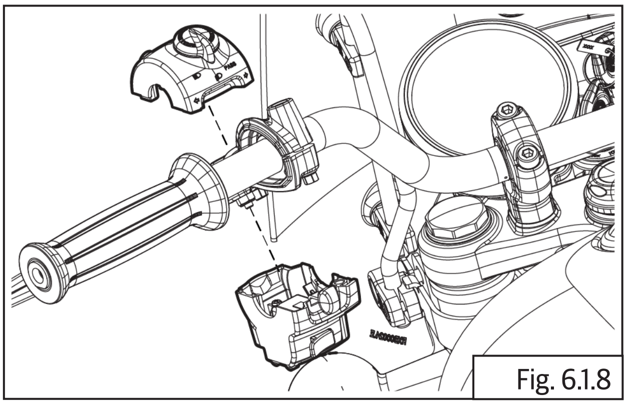

Fig. 6.1.8

6.3.5. Clutch lever bracket

- Wrap a cloth soaked in hot water on LH grip **(a)** and allow the grip to become free on the handle bar. Rotate the grip and pull it outwards to remove from handlebar.

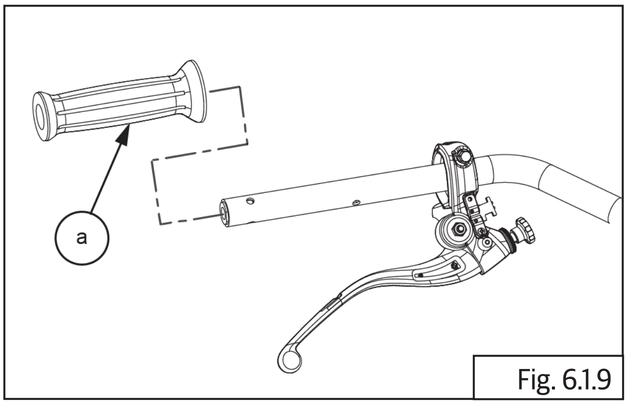

Fig. 6.1.9

- Loosen and remove 1 no hex socket bolts **(M6) (a)** to remove the clutch lever bracket along with the lever.

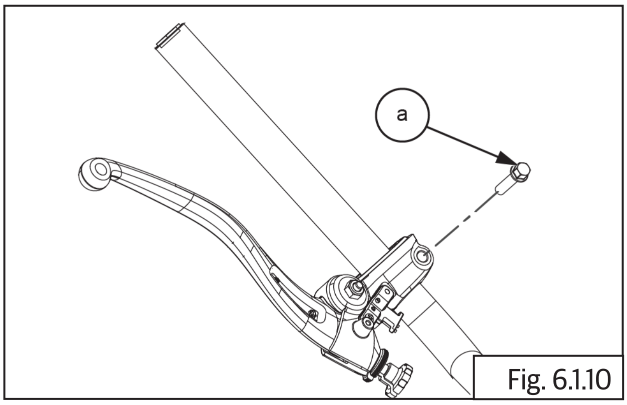

Fig. 6.1.10

🔧	10 mm Allen socket with Ratchet

- Remove clutch lever bracket

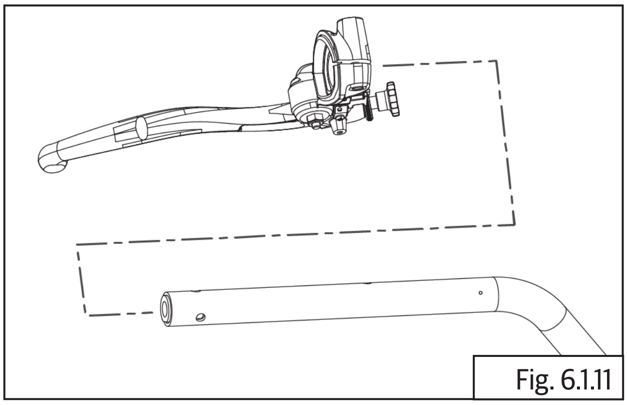

Fig. 6.1.11

6.3.6. RH switch cube

- Remove throttle cable guide plate **(a)** from switch cube lower bracket **(b)**.

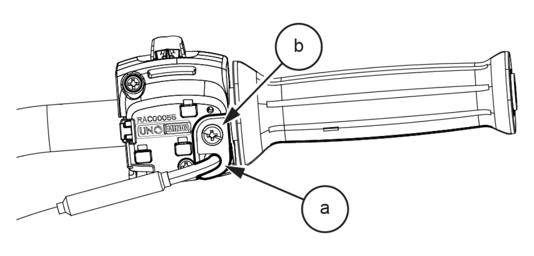

Fig. 6.1.12

🔧	Philips screw driver

- Remove 2 nos. Philips head screws **(a)** from the RH switch cube from handle bar.

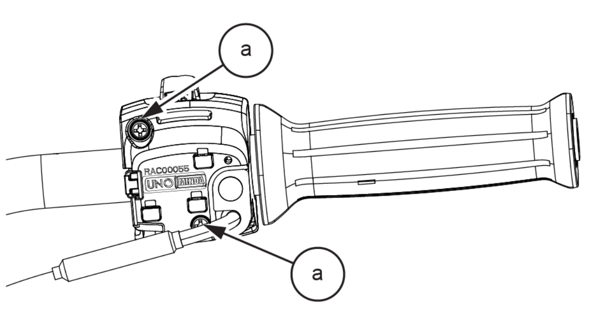

Fig. 6.1.13

🔧	Philips screw driver

- Gently separate the top **(a)** from bottom module **(b)** from handlebar RH.

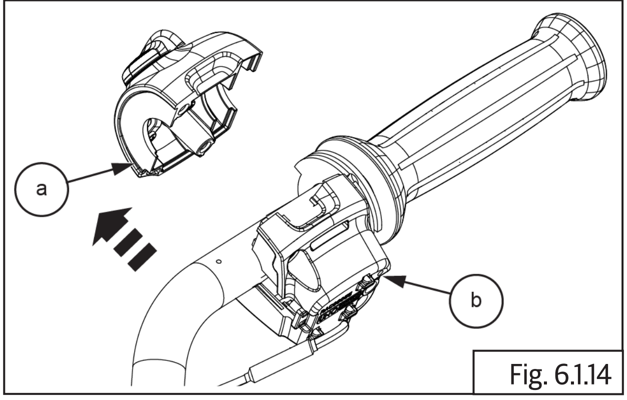

Fig. 6.1.14

- Disconnect the throttle cable **(a)** from the throttle grip **(b)**.

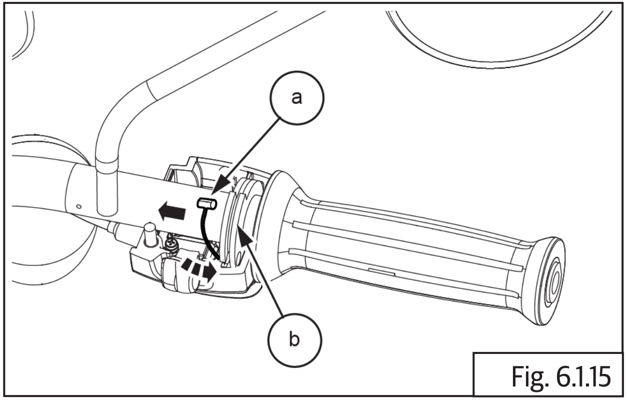

Fig. 6.1.15

- Remove throttle grip **(a)** from the handlebar **(b)**.

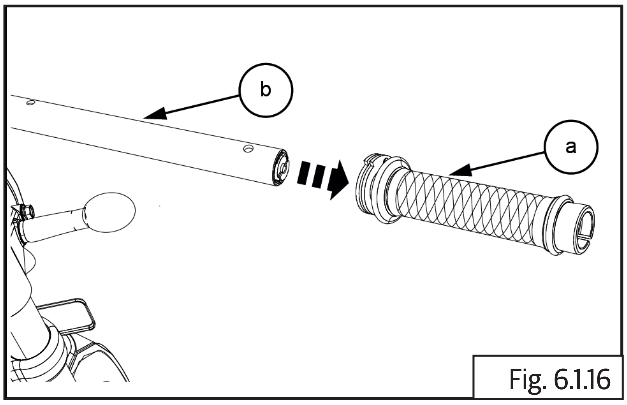

Fig. 6.1.16

6.3.7. Master cylinder

- Remove 2 nos hex socket bolt **(M6)** **(a)** from the master cylinder assembly to remove from the handlebar.

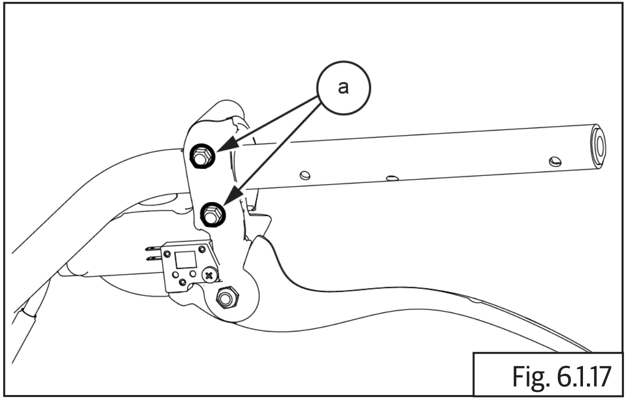

Fig. 6.1.17

🔧	10 mm Socket with Ratchet

6.3.8. Handlebar

- Loosen and remove 4 nos allen bolts **(M8) (a)** from top clamps.

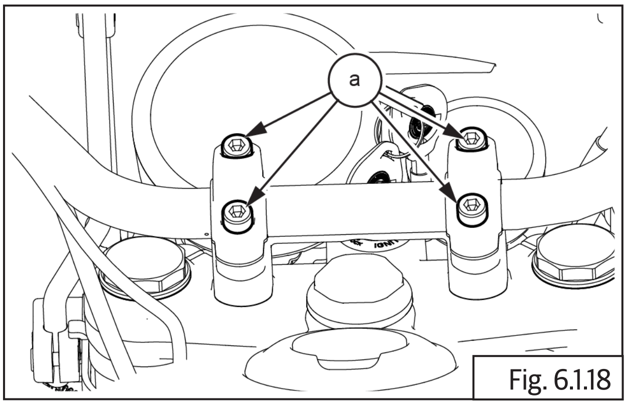

Fig. 6.1.18

	6 mm allen key

- Remove 2 nos clamps from the handlebar.

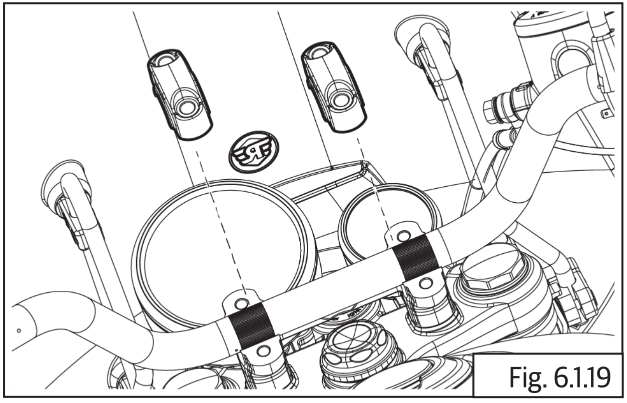

Fig. 6.1.19

- Remove handlebar **(a)**.

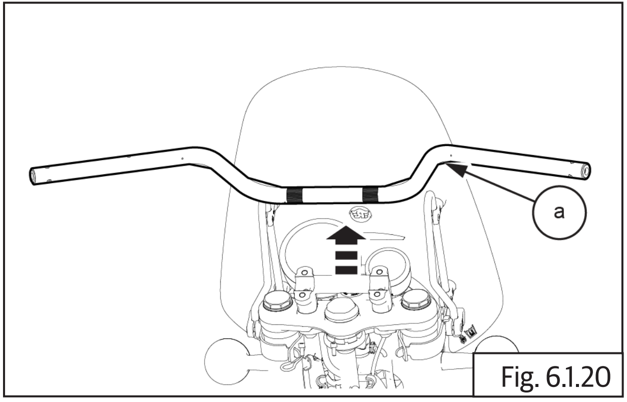

Fig. 6.1.20

6.3.9. Handlebar raiser

- Loosen and remove 2 nos hex flange bolts **(M10) (a)** along with washer from the bottom of the top yoke

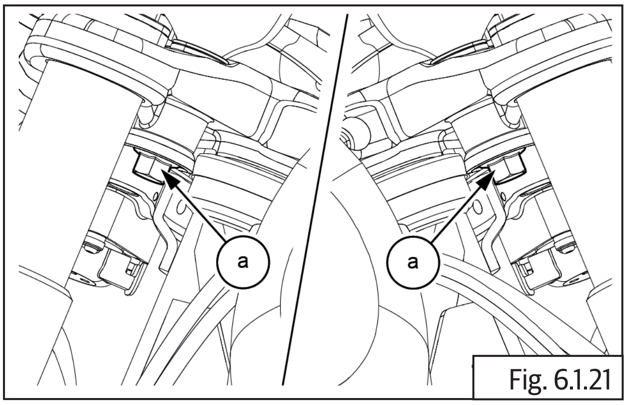

Fig. 6.1.21

	14 mm socket with ratchet

- Gently remove the handlebar raiser from the top yoke.

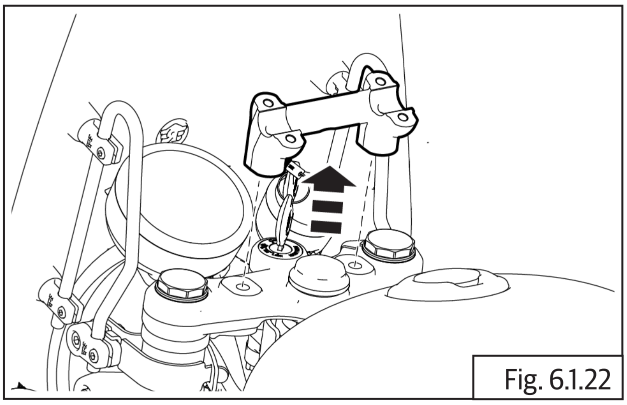

Fig. 6.1.22

Assembly

6.3.10. Handlebar Raiser

- Locate the handle bar raiser on the top yoke.

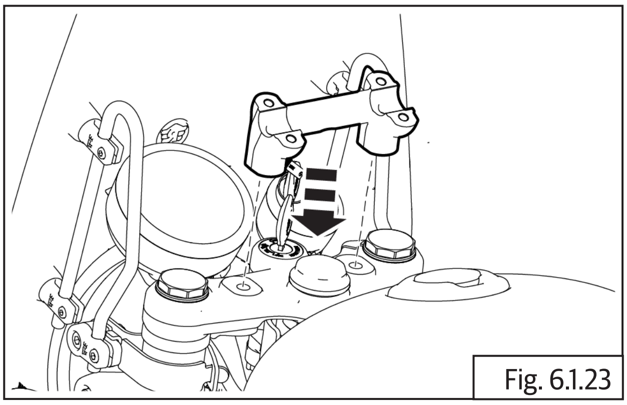

Fig. 6.1.23

- Locate and tighten 2nos hex flange bolts **(M10)** **(a)** and into top yoke and handlebar raiser.

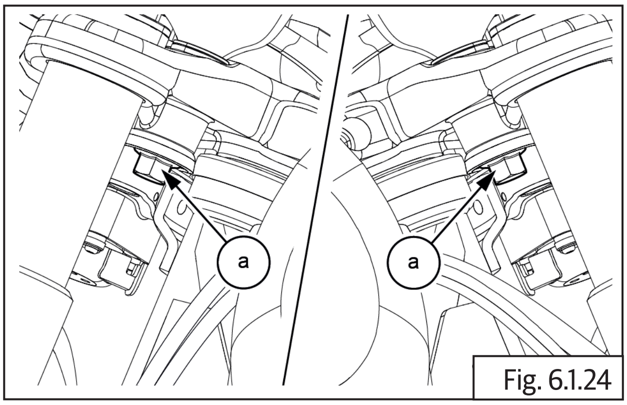

Fig. 6.1.24

🔧	14 mm Socket with Torque wrench
Torque	42-58 N-m/4.2-5.8 kgf-m

6.3.11. Handlebar

- Locate the handlebar **(a)** on the handlebar raiser
- Match punch mark present in handle bar at the mating surface of top and bottom raiser.

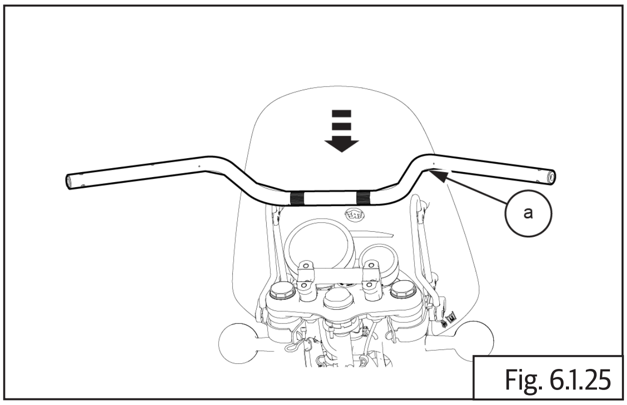

Fig. 6.1.25

- Install top clamp over the handlebar.

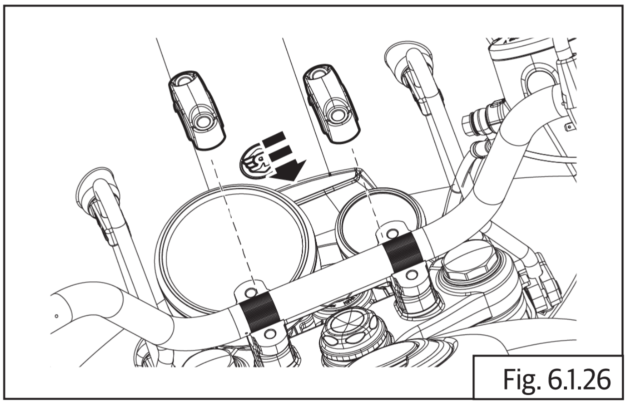

Fig. 6.1.26

- Locate and tighten 4 nos allen bolts **(M8)** into the handlebar clamps in the given sequence.

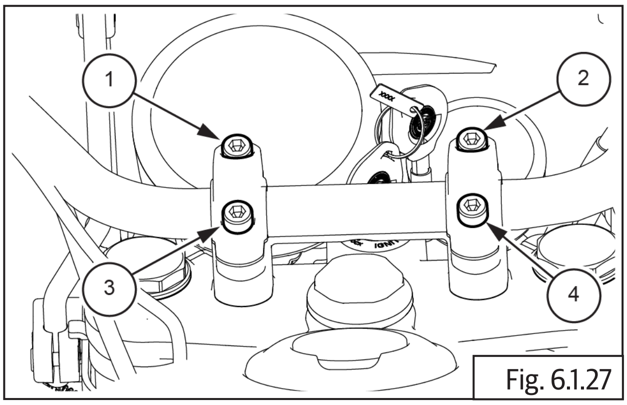

Fig. 6.1.27

🔧	6 mm Allen Socket with Torque wrench
Torque	24-28 N-m/2.4-2.8 kgf-m

6.3.12. Clutch lever bracket

- Position the clutch lever bracket past the hole present in the handlebar.

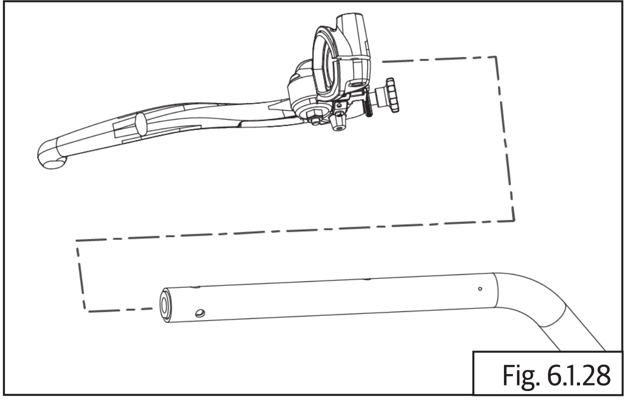

Fig. 6.1.28

- Locate and tighten 1 no hex soc bolt **(M6) (a)**

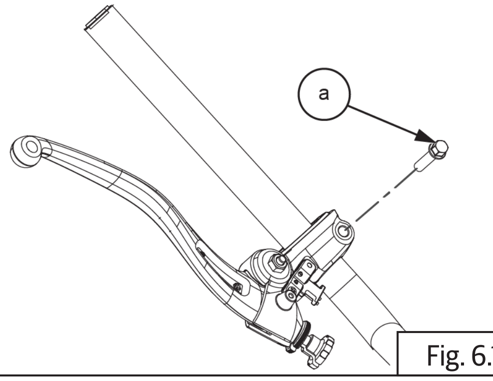

Fig. 6.1.29

🔧	10 mm Socket with Torque wrench
Torque	10-12 N-m/1.0-1.2 kgf-m

6.3.13. LH switch cube

- Locate the switch module on the LH of the handlebar.

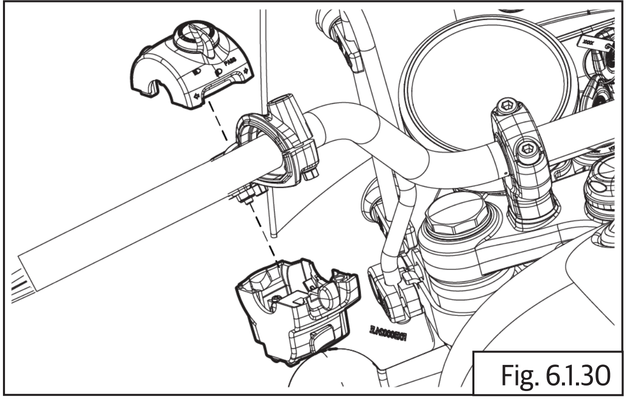

Fig. 6.1.30

- Ensure the peg **(a)** in the module is inserted in the hole provided in the handlebar.

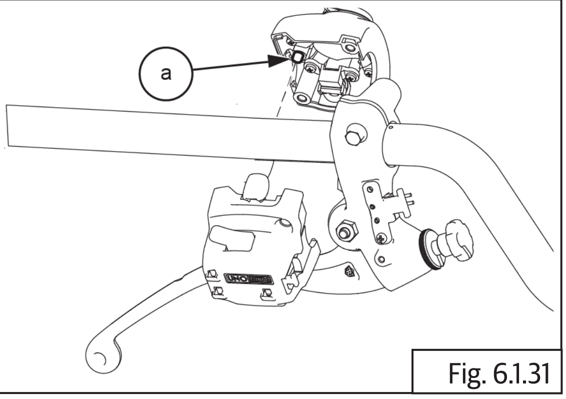

Fig. 6.1.31

- Assemble the top and bottom modules.

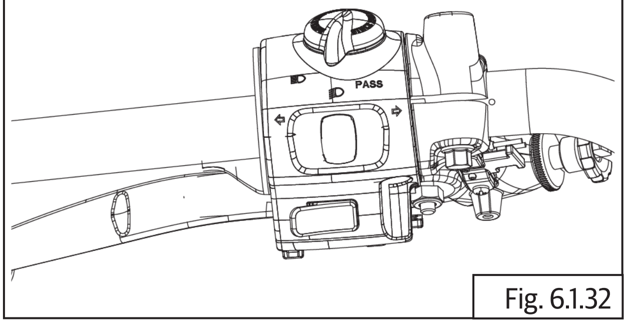

Fig. 6.1.32

- Insert 2 Nos Philips head screws and tighten

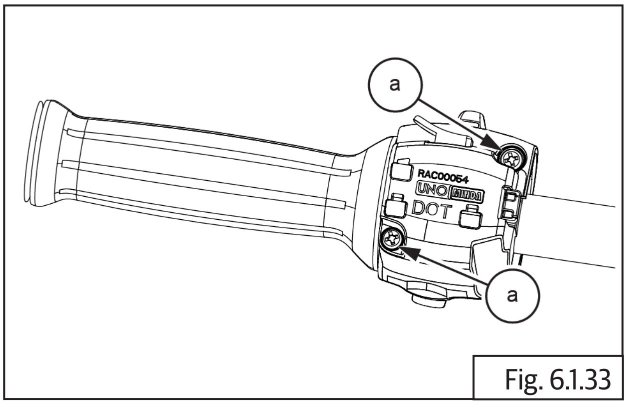

Fig. 6.1.33

🔧	Philips screw driver

- Position the clutch switch **(a)** on the module.

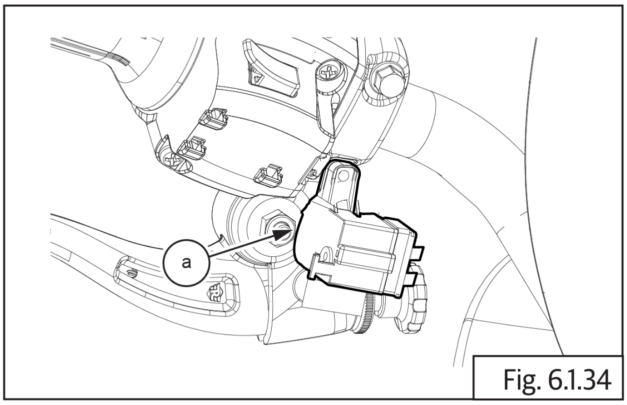

Fig. 6.1.34

- Insert 1 Nos Philips head screw **(a)** and tighten it.

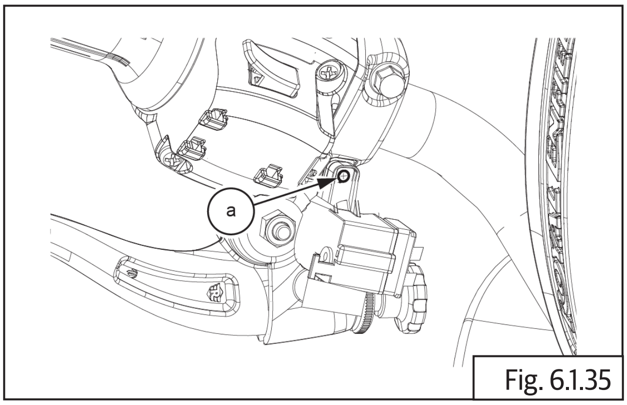

Fig. 6.1.35

- Locate the USB socket **(b)** and insert two screws **(a)** and tighten it.

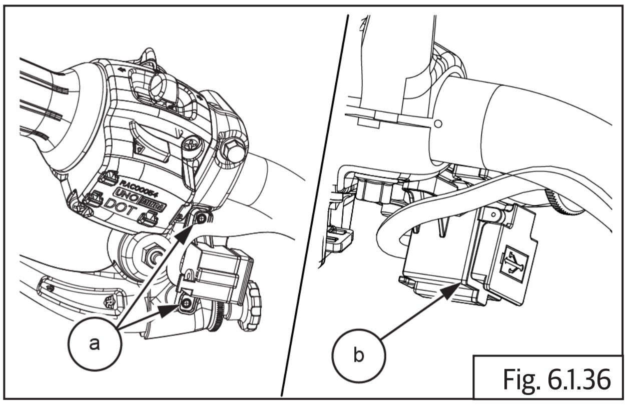

Fig. 6.1.36

🔧	Philips screw driver

- Connect the clutch switch wires.

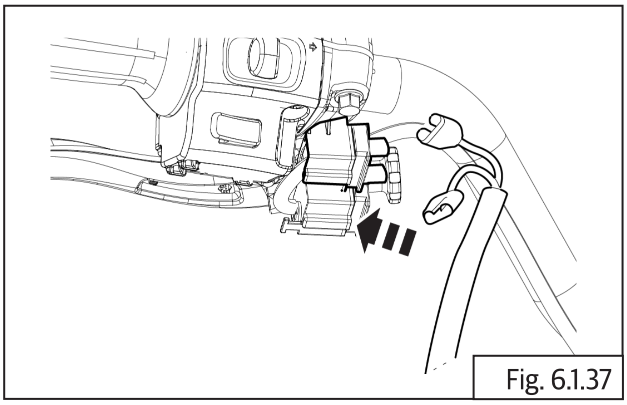

Fig. 6.1.37

- Apply recomended adhesive inside grip.
- Assemble the grip **(a)** and let it rest till it is fixed on the handlebar.

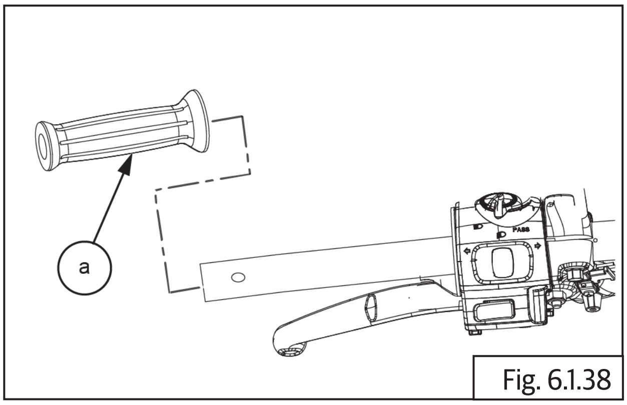

Fig. 6.1.38

6.3.14. RH switchcube

- Lubricate the throttle grip **(a)** with general purpose grease and assemble on handlebar RH **(b)**.

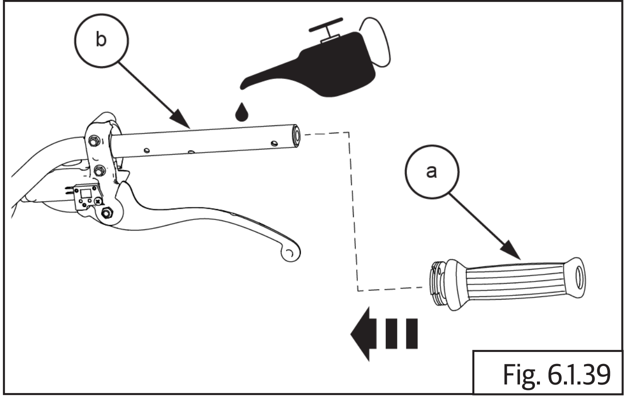

Fig. 6.1.39

- Insert throttle cable **(a)** into the bottom housing **(b)** of the switch cube and connect it to the throttle grip.

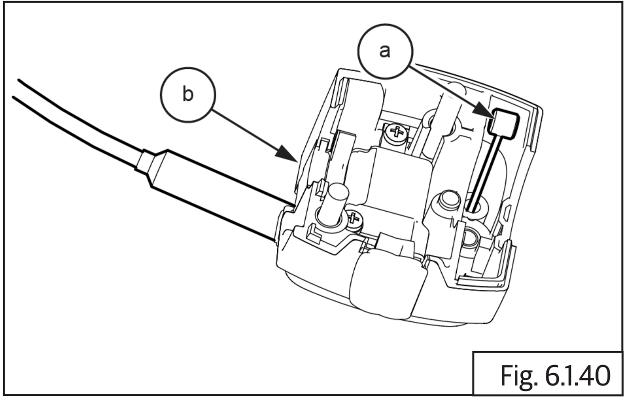

Fig. 6.1.40

- Assemble switch mounting top **(a)** and bottom **(b)** are on handlebar.

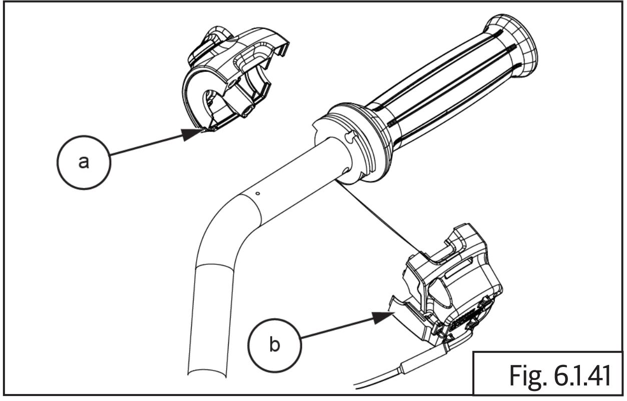

Fig. 6.1.41

- Ensure the peg is inserted in the hole provided in the handlebar.

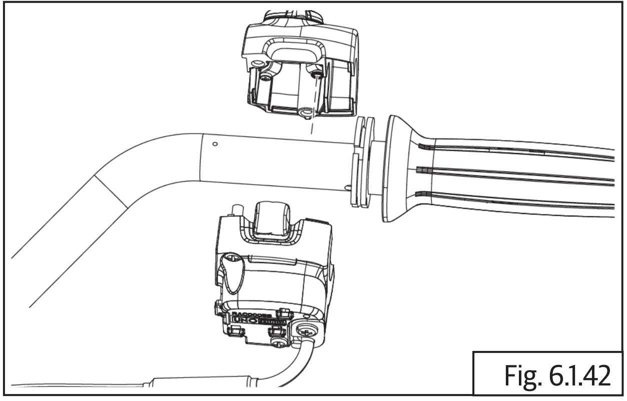

Fig. 6.1.42

- Insert 2 Nos Philips head screws **(a)** on the switch cube and tighten.

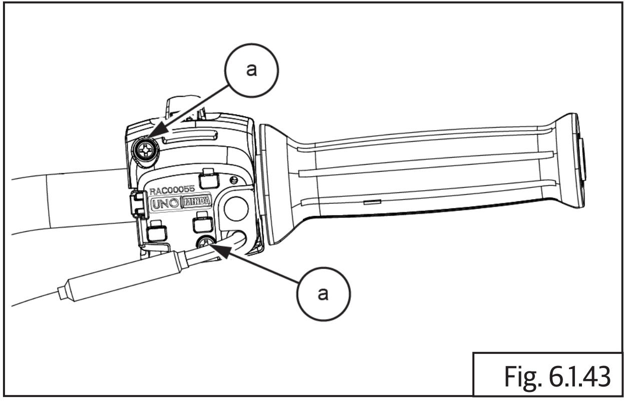

Fig. 6.1.43

🔧	Philips screw driver

- Locate and install the throttle cable guide **(a)** at the lower bracket of the switch cube.

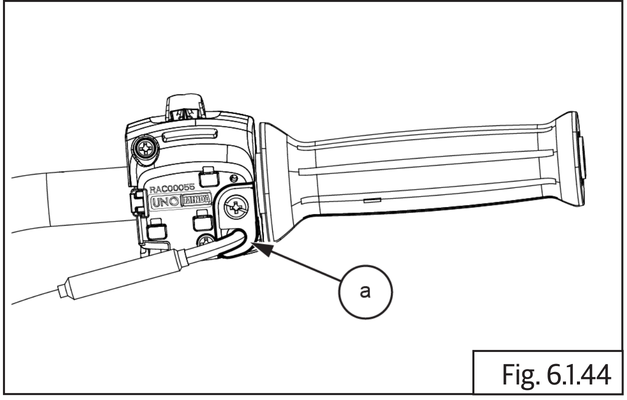

Fig. 6.1.44

- Insert Philips head screw **(a)** and tighten sufficiently.

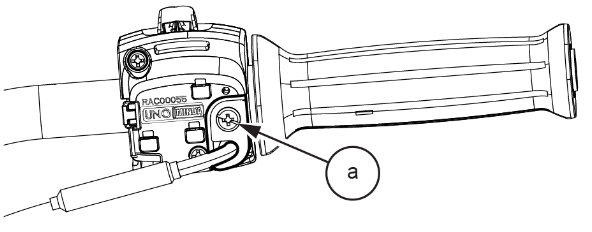

Fig. 6.1.45

6.3.15. Master Cylinder

- Locate the master cylinder bracket against the switch module RH, ensure the lever is slightly lower than the throttle grip.
- Ensure the profile is matching with RH switchcube.

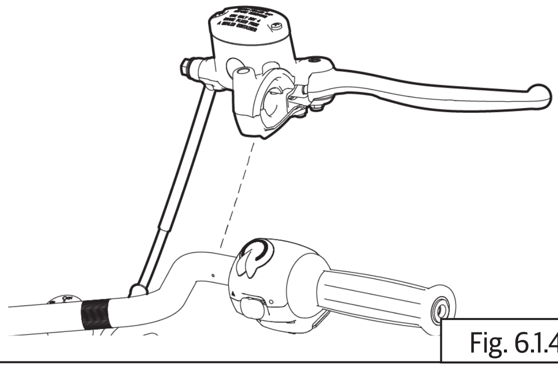

Fig. 6.1.46

- Locate clamp on the handlebar RH and tighten 2 nos hex head bolts **(M5)**.

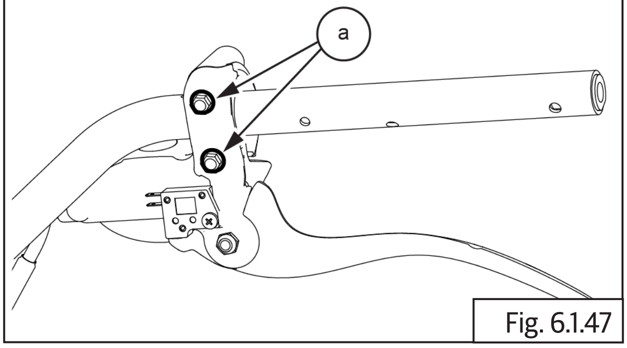

Fig. 6.1.47

🔧	10 mm socket with ratchet

- Install brake light switch **(a)** below the brake lever with 2 Nos philips head screws.

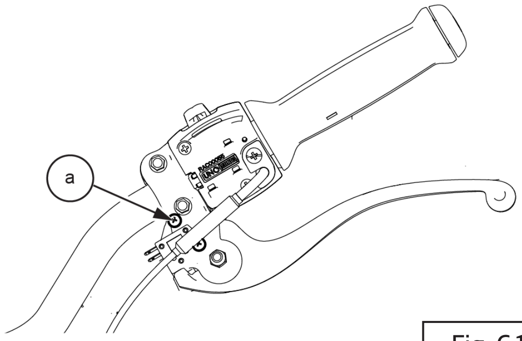

Fig. 6.1.48

🔧	Philips screw driver

6.3.16. Bar End

- Insert and tighten allen bolt **(b)** along with the bar end **(a)** on both sides of the handlebar.

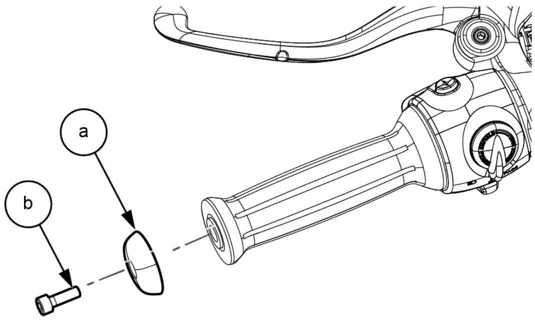

Fig. 6.1.49

🔧	5 mm allen socket with ratchet

6.3.17. Mirrors

Right Hand Side

- Ensure locknut **(a)** on RH mirror is fully tighten.

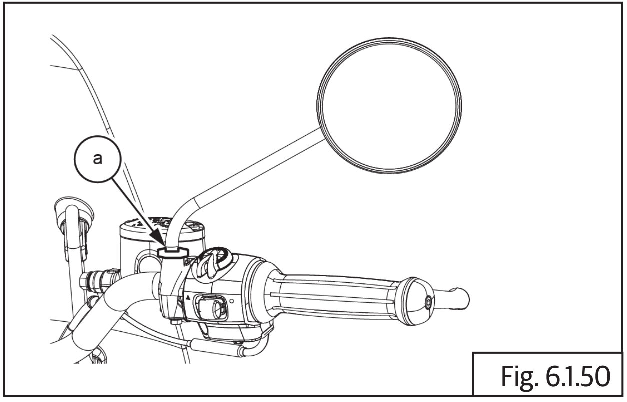

Fig. 6.1.50

- Locate the thread portion of rear view mirror stem on master cylinder bracket. Rotate clockwise till the mirror comes to a stop.

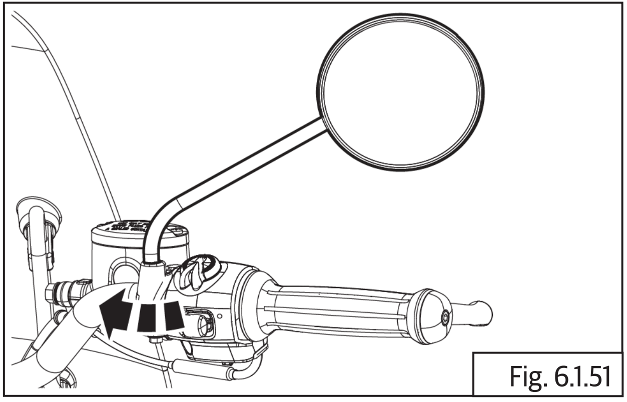

Fig. 6.1.51

- Rotate mirror clockwise for adjusting the view and tighten locknut against bracket.

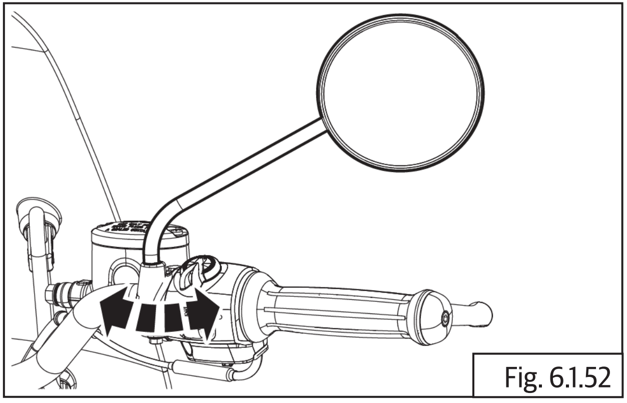

Fig. 6.1.52

🔧	14 mm open end spanner

Left Hand Side

- Ensure locknut **(a)** on LH mirror is fully tighten.

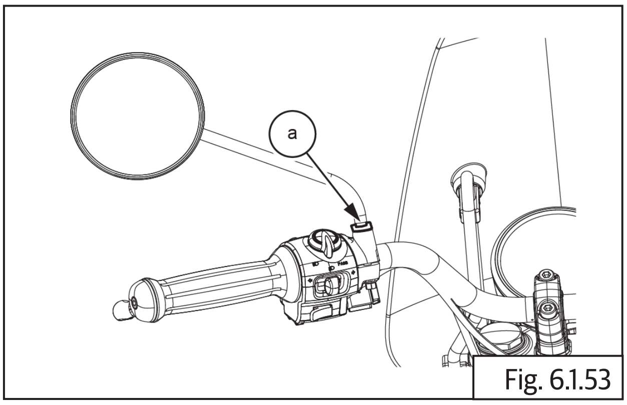

Fig. 6.1.53

- Locate the thread portion of rear view mirror stem on clutch lever bracket. Rotate anti clockwise till the mirror comes to a stop.

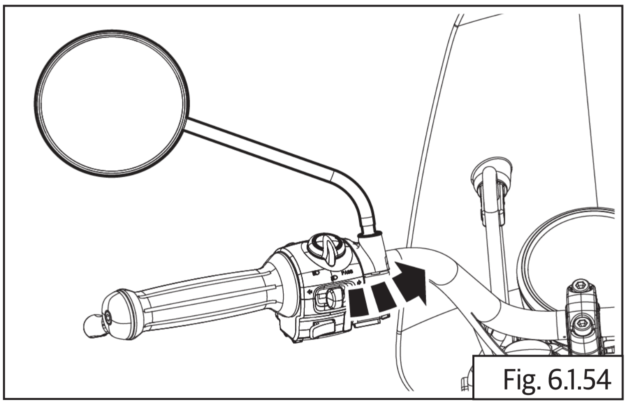

Fig. 6.1.54

- Rotate mirror clockwise for adjusting the view and tighten locknut against bracket.

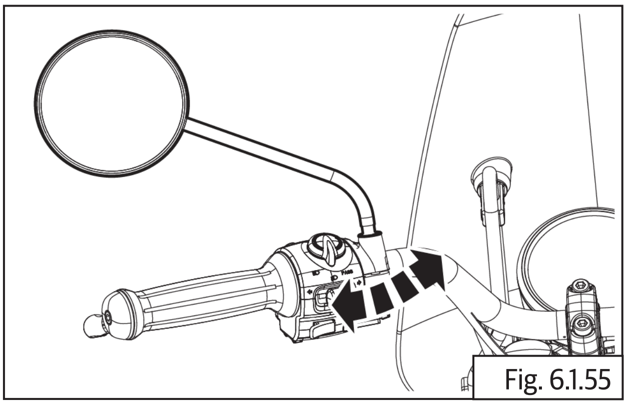

Fig. 6.1.55

🔧	14 mm open end spanner

EXHAUST PIPE, SILENCER AND CATALYTIC CONVERTER

EXHAUST PIPE, SILENCER AND CATALYTIC CONVERTER

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6.4. Exhaust Pipe, silencer and catalytic converter.

Dismantling

⚠ CAUTION

DO NOT perform any operation on exhaust pipe, silencer and catalytic converter soon after the engine is turned OFF. The exhaust components will be extremely hot and can cause serious injuries and burns.

6.4.35. Silencer

- Loosen and remove 3 Nos. hex socket bolts **(M6) (a)** from the silencer guard at muffler end.

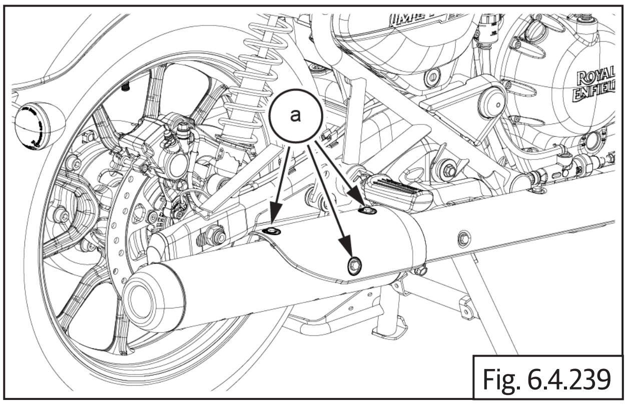

Fig. 6.4.239

🔧	10 mm socket with ratchet

- Remove silencer guard **(a)** along with bolts **(b)**.

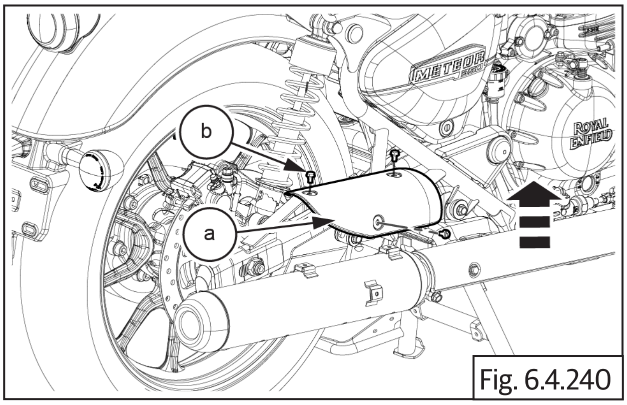

Fig. 6.4.240

- Remove 3 nos hex socket bolts **(M6) (a)**from silencer guard at the header pipe end.

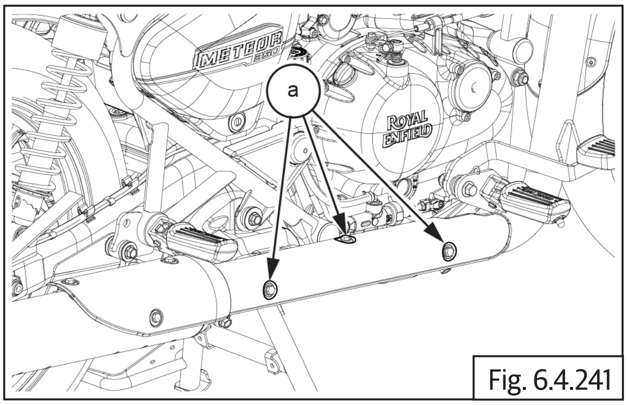

Fig. 6.4.241

🔧	10 mm socket with ratchet

- Remove the silencer guard along with bolts.

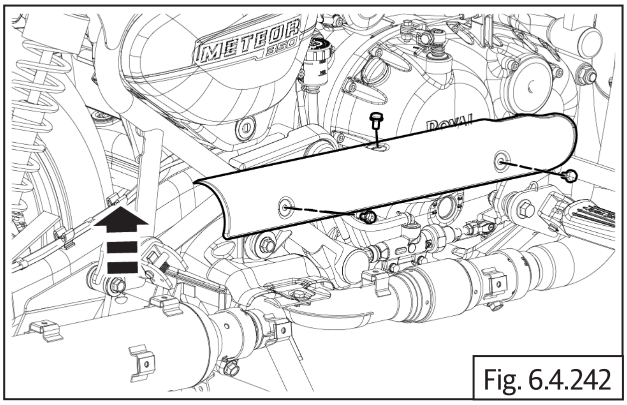

Fig. 6.4.242

- Remove the heder pipe mounting bolt **(a)** in the catalytic converter.

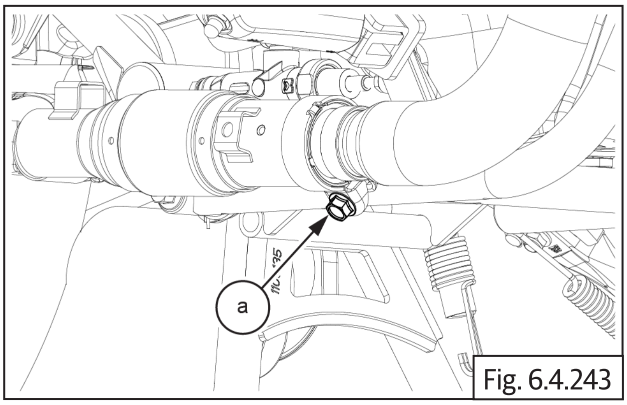

Fig. 6.4.243

🔧	12 mm socket with ratchet

- Remove silencer mounting bolt **(a)** from Catalytic coverter and from frame **(b)**.

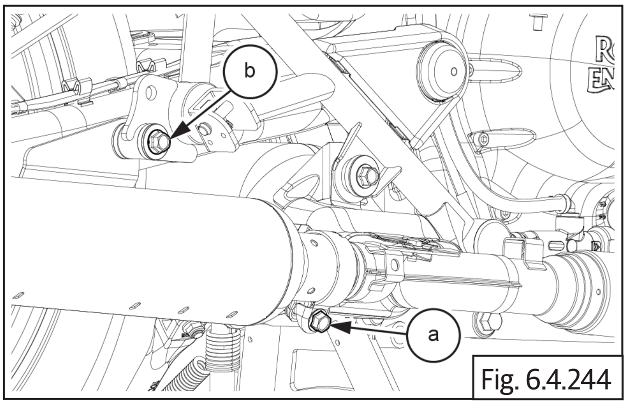

Fig. 6.4.244

🔧	12 mm socket with ratchet

- Gently pull the silencer outwards to remove.

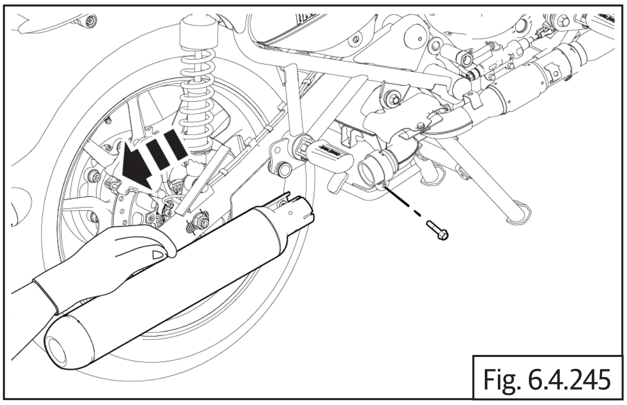

Fig. 6.4.245

6.4.36. Catalytic Converter

- Remove catalytic converter mounting bolt **(a) (M8)** along with washers **(b)** and rubber gromet **(c)**.

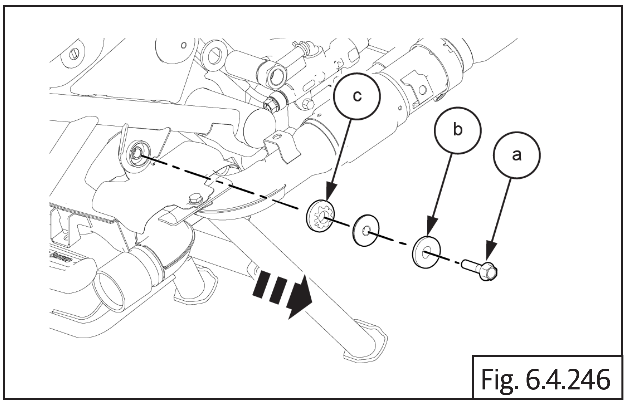

Fig. 6.4.246

🔧	12 mm socket with ratchet

- Remove the catalytic converter mounting bolt **(a) (M8)** along with two washers **(b)** and two rubber grommets **(c)** from left side of the frame.

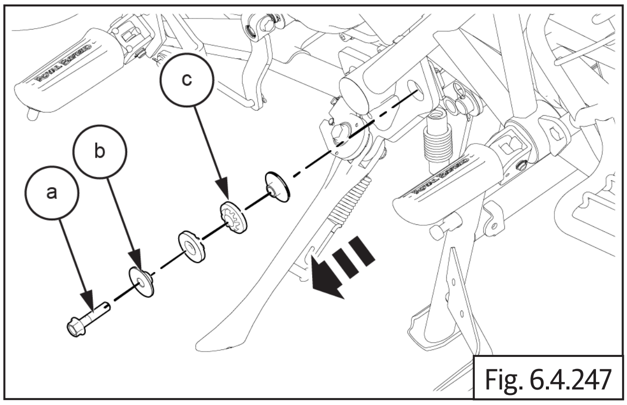

Fig. 6.4.247

🔧	12 mm socket with ratchet

- Gently remove the catalytic converter **(a)** from the frame

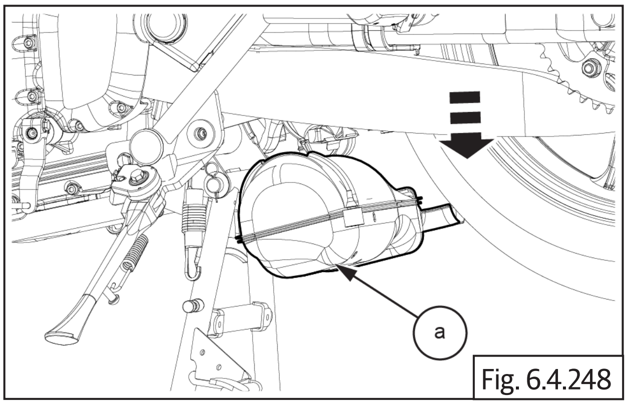

Fig. 6.4.248

6.4.37. Exhaust Header Pipe

- Remove 2 nos 14 mm nuts **(a)** from the cylinder head assembly.

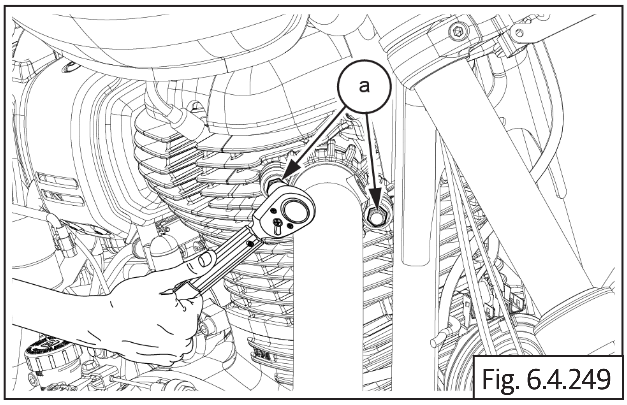

Fig. 6.4.249

🔧	14 mm socket with ratchet

- Remove the exhaust header pipe along with 2 nos mounting fins **(a)**.

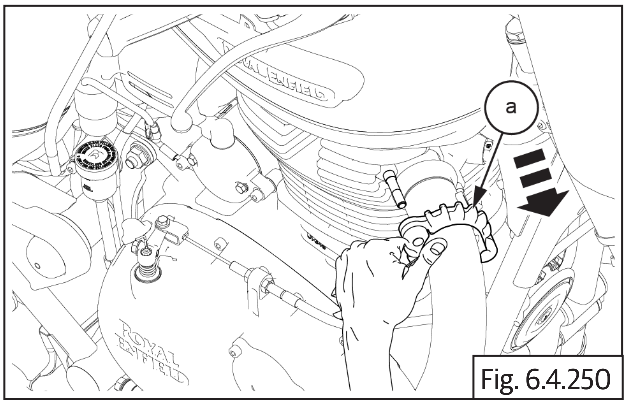

Fig. 6.4.250

- Remove the exhaust header pipe **(a)**.

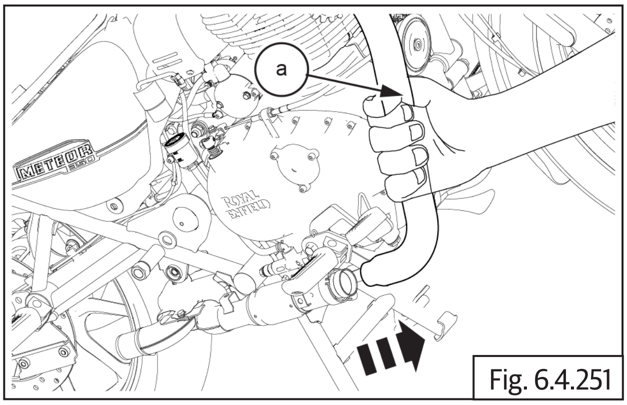

Fig. 6.4.251

6.4.38. Oxygen /O2 Sensor

- Refer headlamp dismantling section to remove O2 sensor socket.
- Loosen and remove O2 sensor **(a)** from the header pipe.

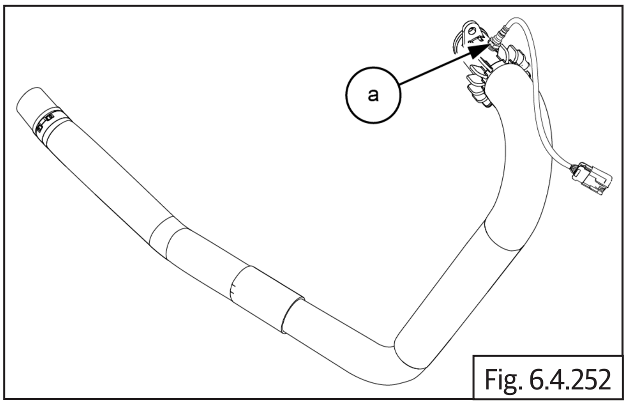

Fig. 6.4.252

🔧	17 mm open end spanner

Assembly

6.4.39. Oxygen /O2 Sensor

- Locate and tighten Oxygen sensor **(a)** on the exhaust header pipe.

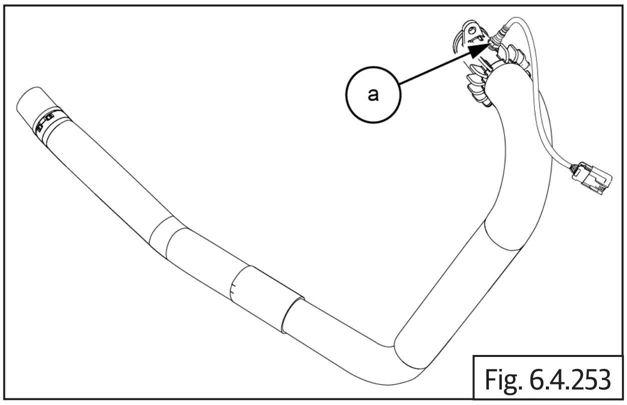

Fig. 6.4.253

🔧	17 mm socket with Ratchet
Torque	15-20 N-m/1.5-2.0 kgf-m

6.4.40. Exhaust Header Pipe

- Locate exhaust pipe **(a)** into exhaust manifold on the cylinder head and ensure the exhaust pipe flange is properly located on the studs.

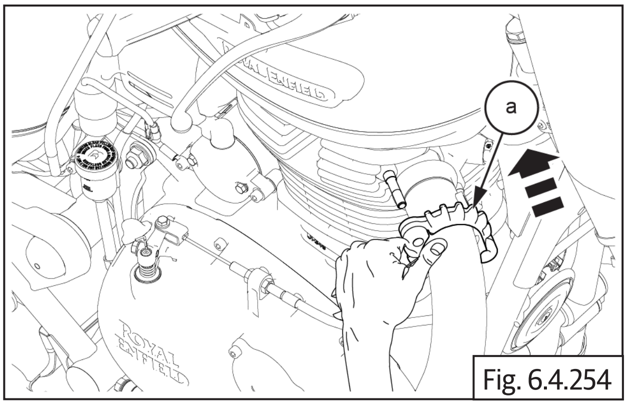

Fig. 6.4.254

- Assemble 2 nos hex nuts on the studs and hand tight it to align the rear end mounting.

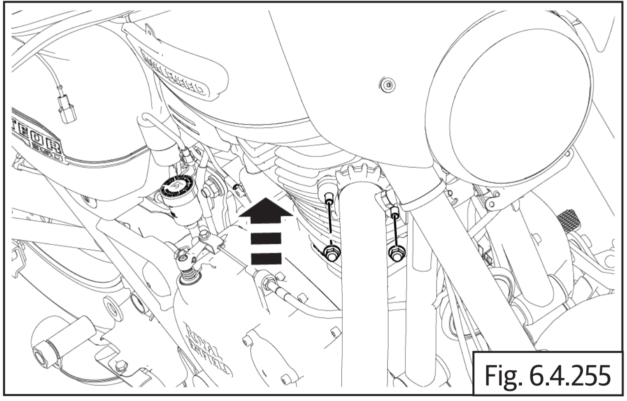

Fig. 6.4.255

	14 mm socket with ratchet

6.4.41. Catalytic converter

- Locate the catalytic converter in the bottom of the frame.

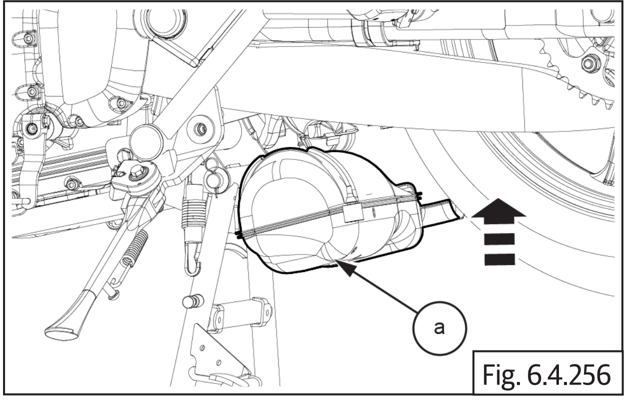

Fig. 6.4.256

- Locate mounting bolt **(a)** along with washer **(b)** and grommets **(c)** the **(M8)** bolt on the LH frame.

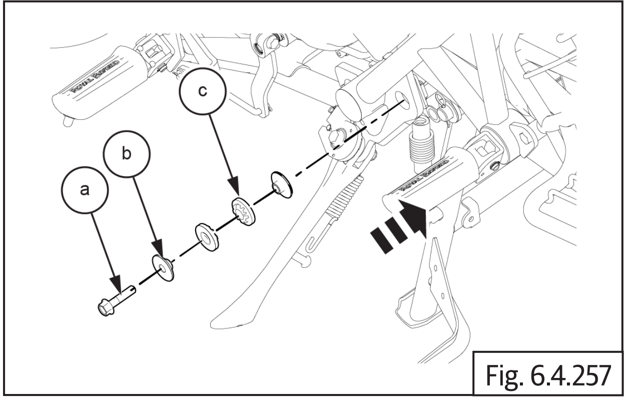

Fig. 6.4.257

	12 mm socket with ratchet
Torque	25-35N-m/2.5-3.5 kgf-m

- Locate mounting bolt **(a)** along with washer **(b)** and grommets **(c)** the **(M8)** bolt on the RH frame.

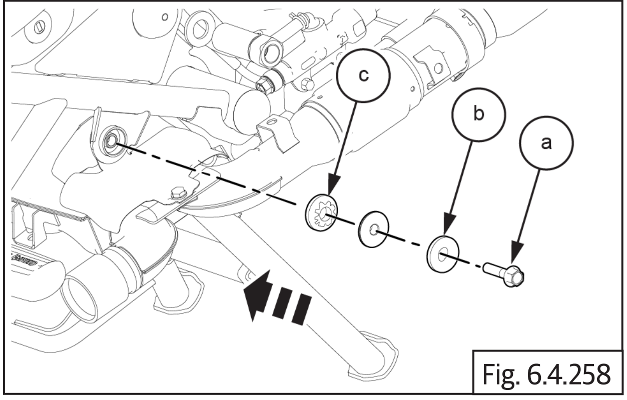

Fig. 6.4.258

	12 mm socket with ratchet
Torque	25-35 N-m/2.5-3.5 kgf-m

- Insert the outer end of the exhaust header pipe into the intake of the catalytic converter.

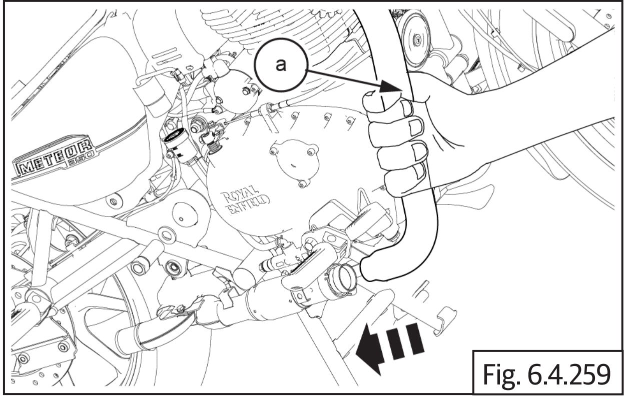

Fig. 6.4.259

- Tighten the clamp bolt **(a)** at exhaust header pipe outer end.

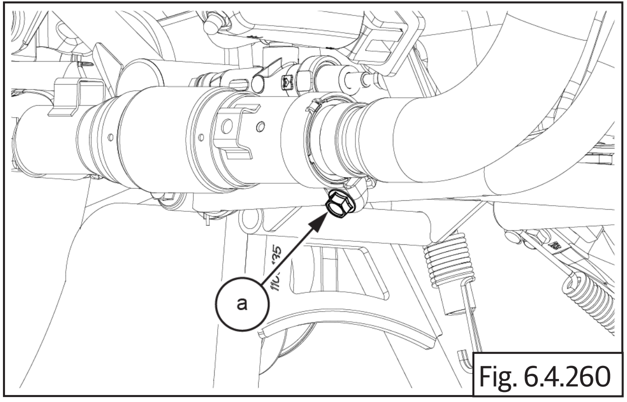

Fig. 6.4.260

	12mm socket with ratchet
Torque	28-35 N-m/2.8-3.5 kgf-m

- Tighten the exhaust header pipe mounting bolts **(a)** at the cylinder head end.

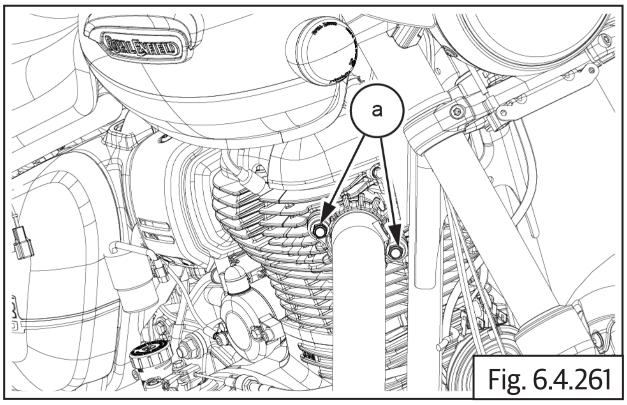

Fig. 6.4.261

🔧	14 mm socket with torque wrench
Torque	21-29 N-m/2.1-2.9 kgf-m

6.4.42. Silencer

- Insert the silencer in the catalytic converter outer pipe.

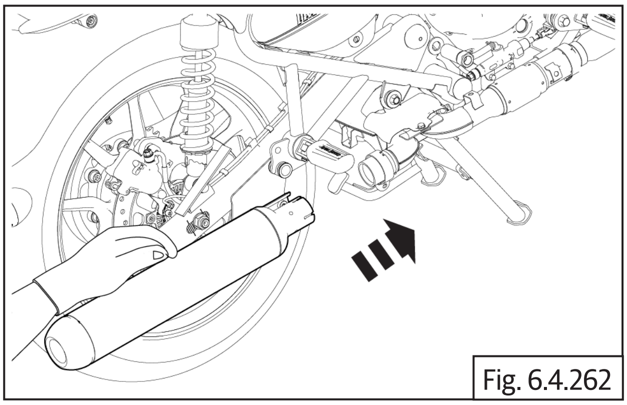

Fig. 6.4.262

- Locate the mounting hole in the frame and insert **(M8) (a)** bolt and tighten it.

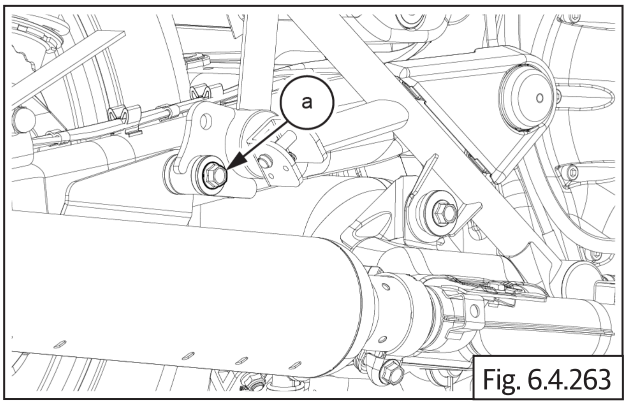

Fig. 6.4.263

🔧	12 mm socket with ratchet
Torque	21-29 N-m/2.1-29 kgf-m

- Tighten the mounting clamp bolt **(a)** at the catalytic converter end.

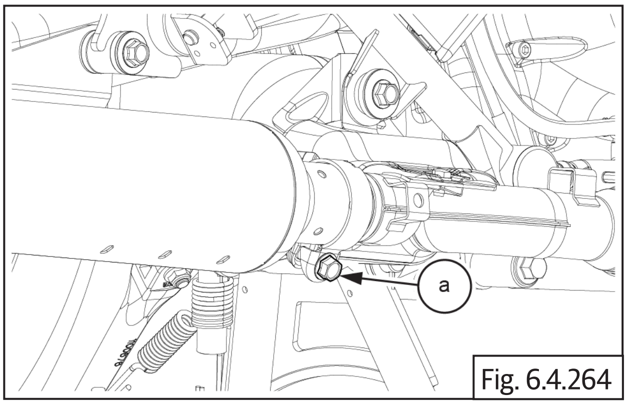

Fig. 6.4.264

🔧	12 mm socket with ratchet
Torque	20-25 N-m/2.0-2.5 kgf-m

- Locate the silencer guard back plate **(a)** and fix it in the silencer with 3 Nos **(b) (M6)** hex socket bolts..

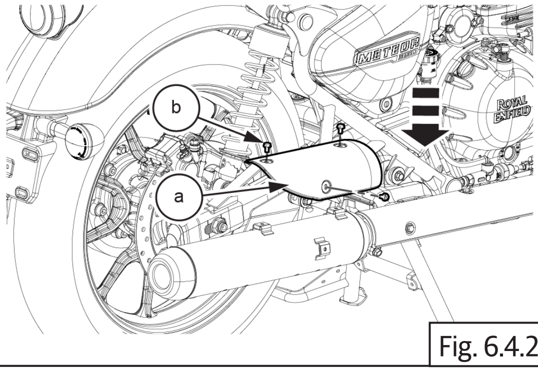

Fig. 6.4.265

🔧	10 mm socket with ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Locate the silencer guard front plate and fix it on the silencer with 3 nos **(M6)** hex socket bolts.

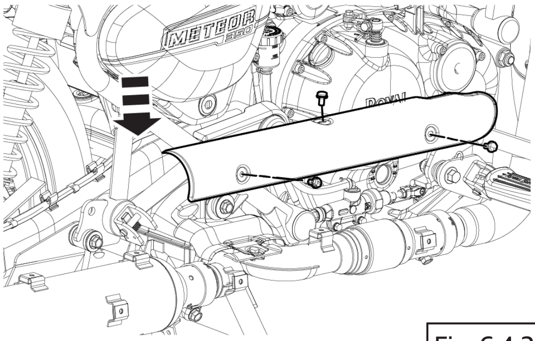
Fig. 6.4.266

🔧	10 mm socket with ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

FOOTREST/STAND/SAREE GUARD

FOOTREST/STAND/SAREE GUARD

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6.5. Footrests, Stands and Saree Guard Dismantling

6.5.43. Rider LH and RH

- Remove the circlip **(a)** at the bottom of the footrest.

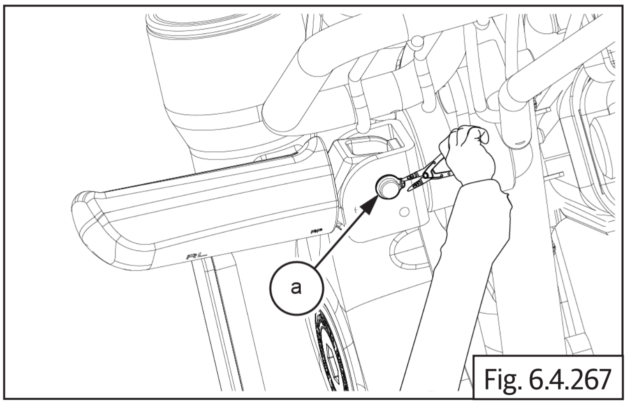

Fig. 6.4.267

Circlip Expander

- Push the pin **(a)** on the upward direction to remove the footrest **(b)** along with spring **(c)**.

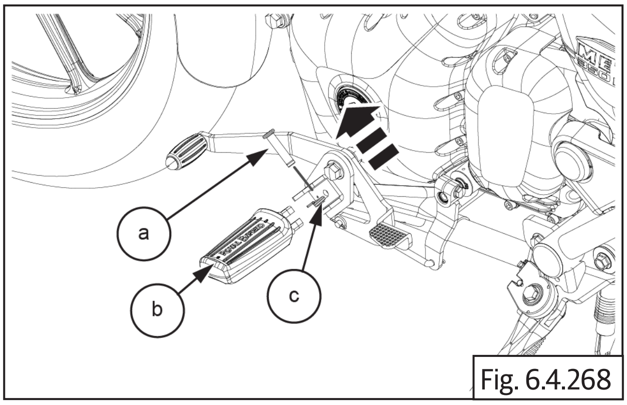

Fig. 6.4.268

6.5.44. Pillion LH and RH

- Remove circlip **(a)** from the bottom of the footrest.

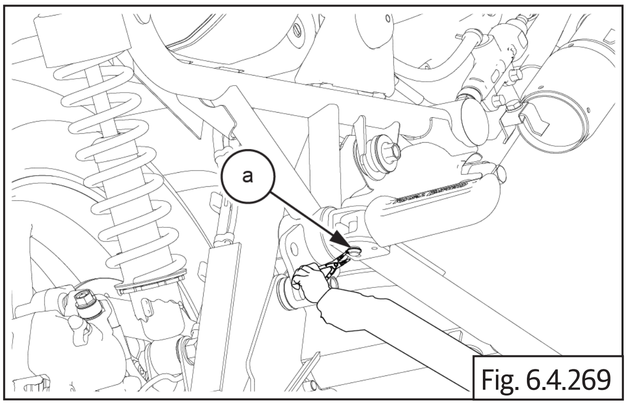

Fig. 6.4.269

Circlip expander

- Gently pull out pin **(a)** from the top supporting the footrest.

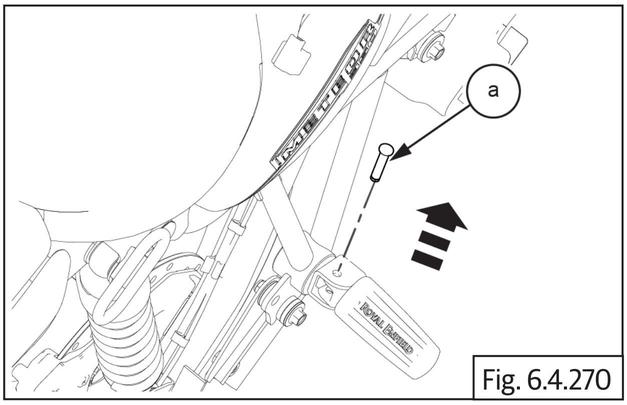

Fig. 6.4.270

- Remove footrest **(a)** from mounting bracket carefully along with ball **(b)** and spring **(c)**.

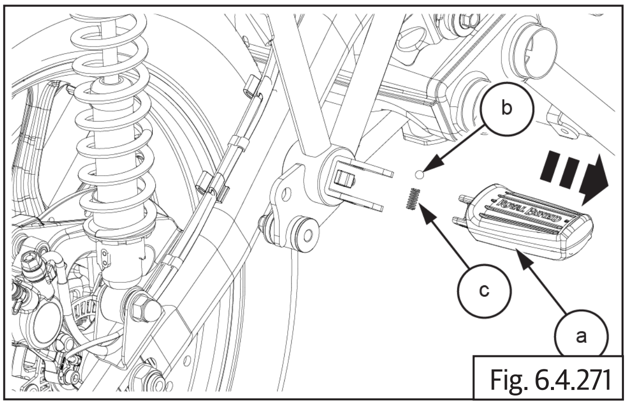

Fig. 6.4.271

6.5.45. Footrest mounting bracket (pillion)

- Loosen and remove hex nut **(a)** **(M10)** from inner side of the frame and remove bracket **(b)** and bolt **(c)**.

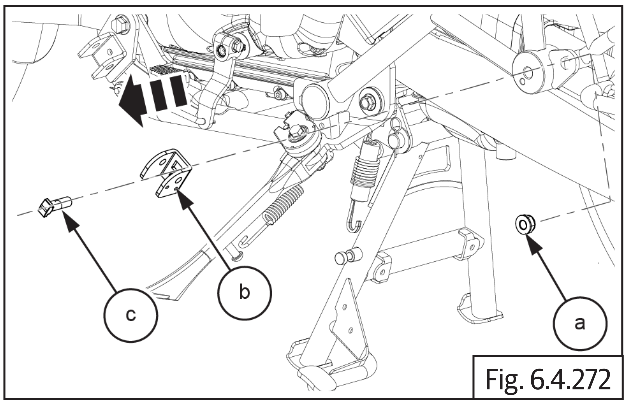

Fig. 6.4.272

12 mm Socket with Ratchet

6.5.46. Side Stand

- Ensure the vehicle is on the main stand and is placed in a firm and flat surface.
- Loosen and remove M6 bolt **(a)** from the side stand switch.

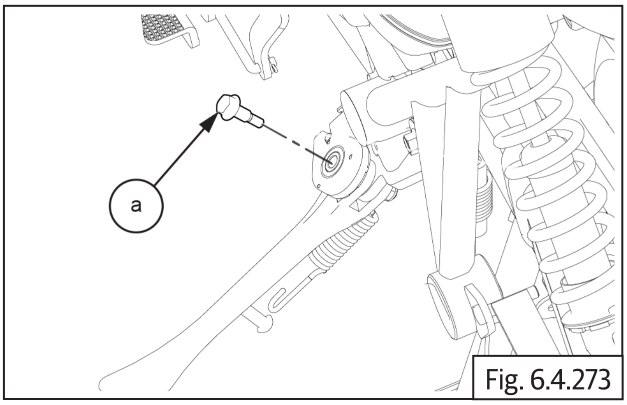

Fig. 6.4.273

🔧	12 mm Socket with Ratchet

- Remove side stand switch **(a)**.

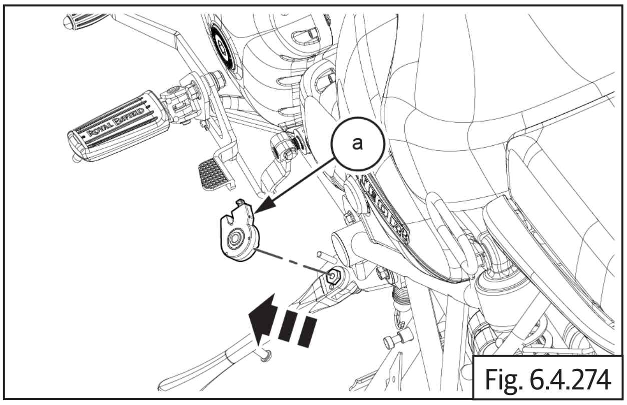

Fig. 6.4.274

- Remove spring **(a)** from the side stand.

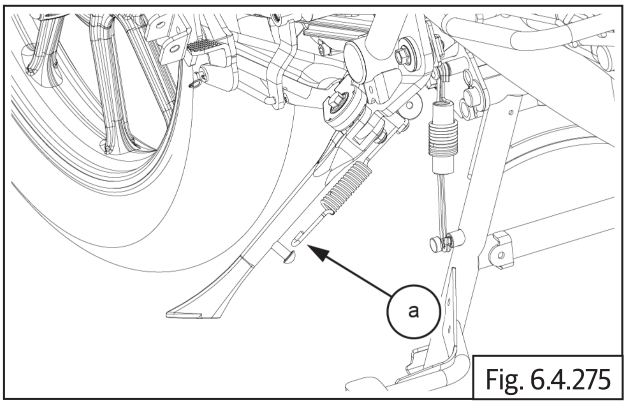

Fig. 6.4.275

🔧	Screw driver

- Remove the hex nut **(a)** from the back side of the stand.

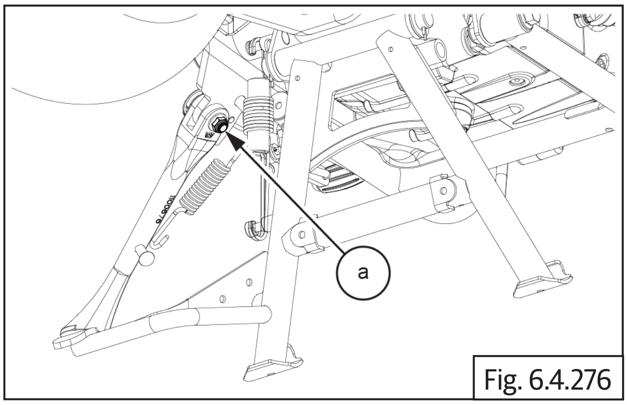

Fig. 6.4.276

🔧	12 mm Socket with Ratchet

- Gently pull the bolt **(a)** to remove.

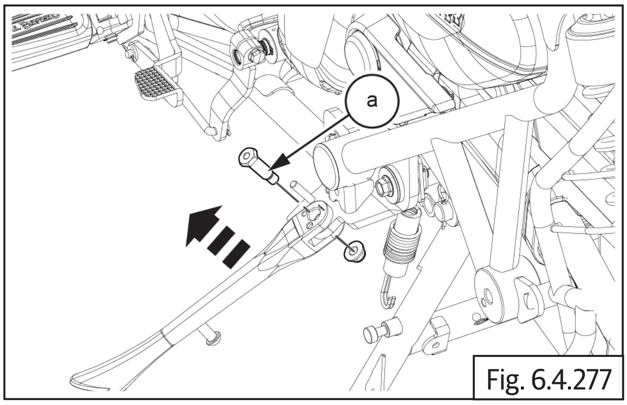

Fig. 6.4.277

- Remove the stand **(a)**.

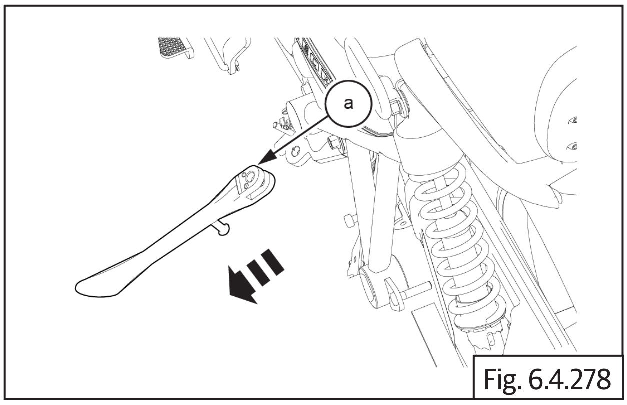

Fig. 6.4.278

Saree Guard Dismantling

6.5.47. Saree guard (For Indian market only)

- Remove bolt **(a) (M8)** from LH frame.

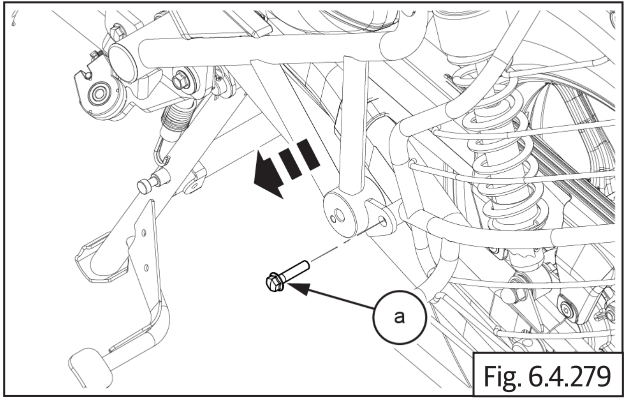

Fig. 6.4.279

	12 mm socket with ratchet

- Remove Rear shock absorber mounting bolt **(a)**.

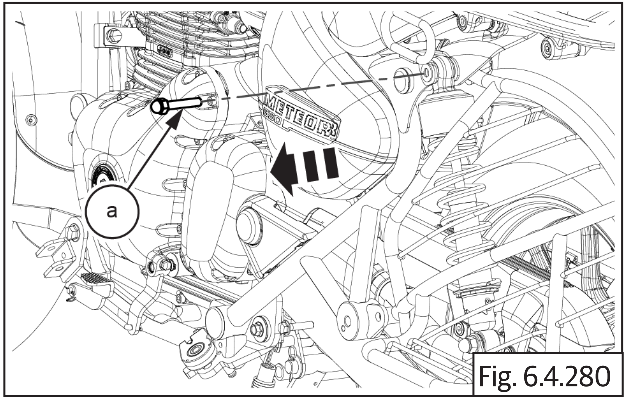

Fig. 6.4.280

	17 mm socket with ratchet

- Remove 1 no **(M6)** **(a)** Hex head bolt along with washers located inside the rear mudguard.

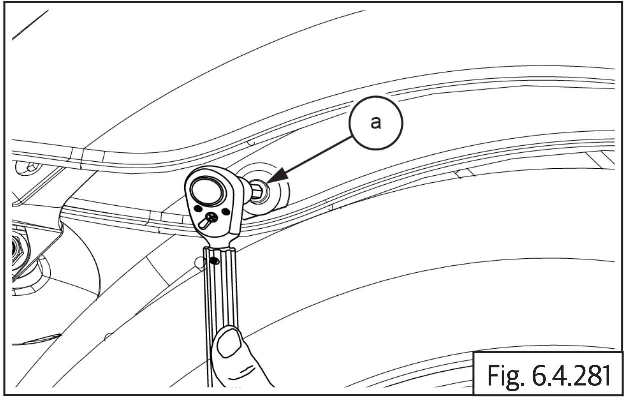

Fig. 6.4.281

	10 mm Socket with ratchet

- Remove the saree guard **(a)**.

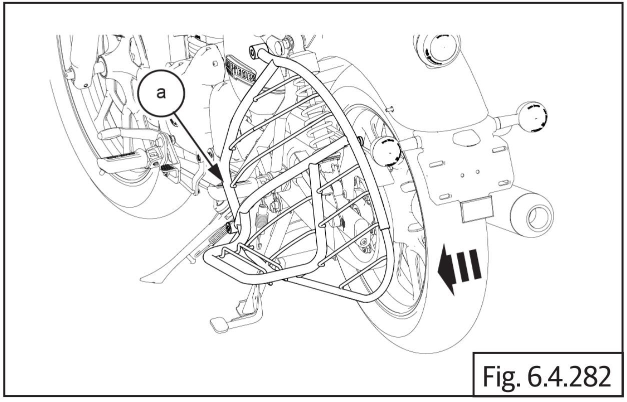

Fig. 6.4.282

Footrest Assembly

6.5.48. Rider LH and RH

- Locate the spring **(a)** between the footrest **(b)** and mounting bracket **(c)**.

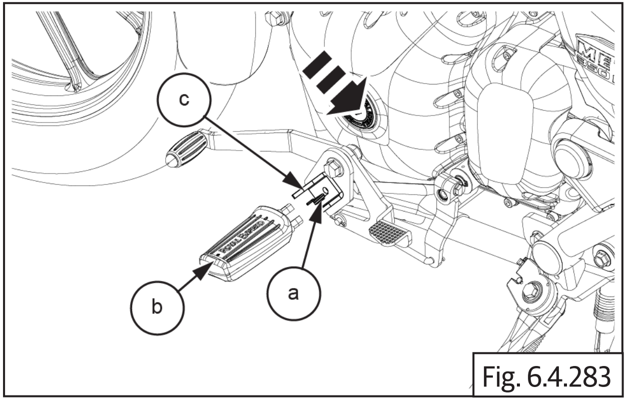

Fig. 6.4.283

- Insert the pin **(a)** along with washer.

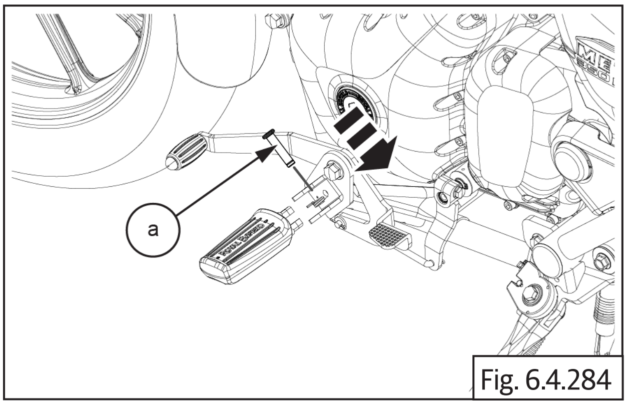

Fig. 6.4.284

- Install the circlip **(a)** at the bottom of the pin.

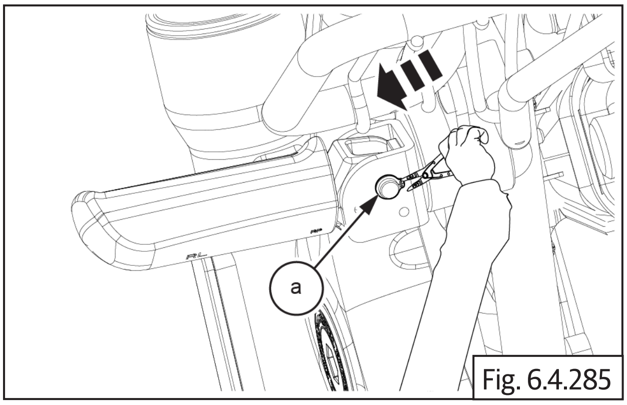

Fig. 6.4.285

🔧	Circlip expander

6.5.49. Footrest mounting bracket (pillion)

- Positon bracket against the frame such that the locking peg **(a)** in the bracket is located into the hole in frame **(b)**. Assemble the nut (M8) from the inner side of the frame.

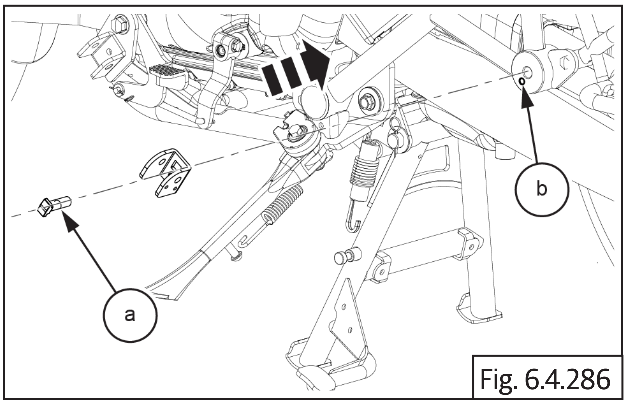

Fig. 6.4.286

- Assemble the nut **(a) (M8)** from the inner side of the frame.

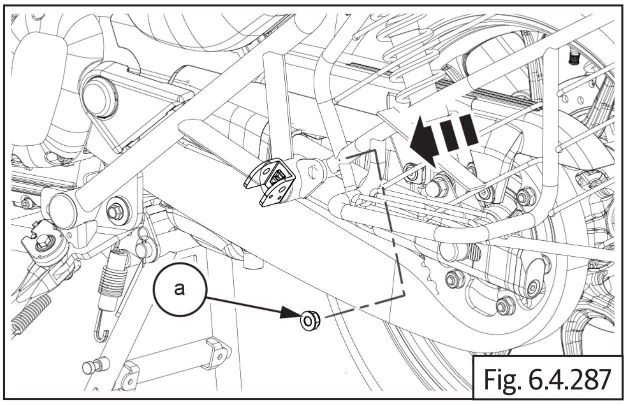

Fig. 6.4.287

🔧	12 mm double end spanner
Torque	10-12 N·m/1.0-1.2 kgf-m

6.5.50. Pillion LH and RH

- Install spring **(a)** in the grove provided **(b)**.

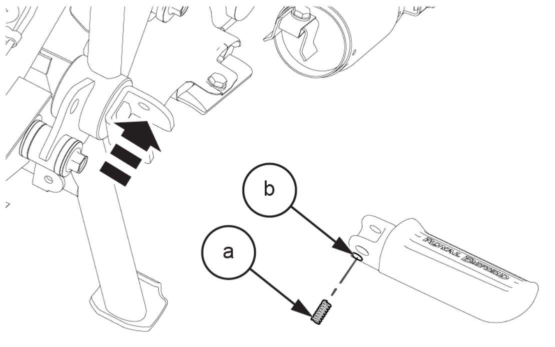

Fig. 6.4.288

- Apply grease on the ball **(a)** slightly and locate it on the hole **(b)** in the footrest.

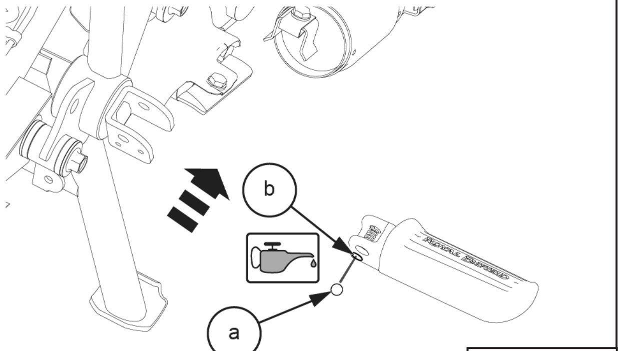

Fig. 6.4.289

- Locate the footrest **(a)** carefully on the mounting bracket **(b)** without disturbing the ball.

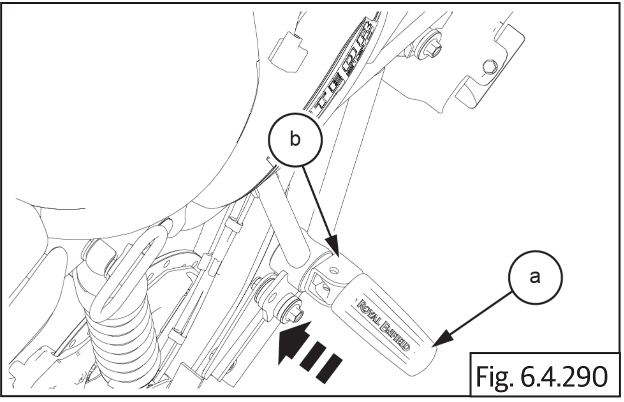

Fig. 6.4.290

- Install pin **(a)** along with washer.

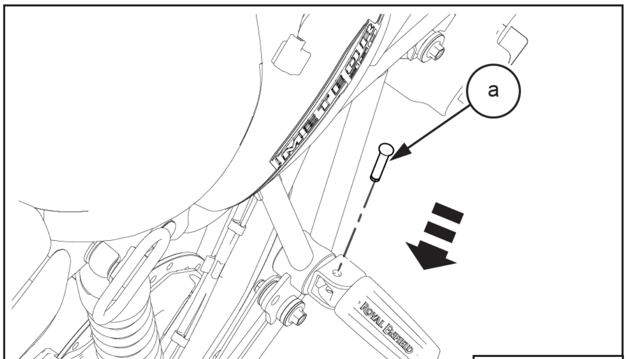

Fig. 6.4.291

- Install the circlip **(a)** at the bottom of the pin.

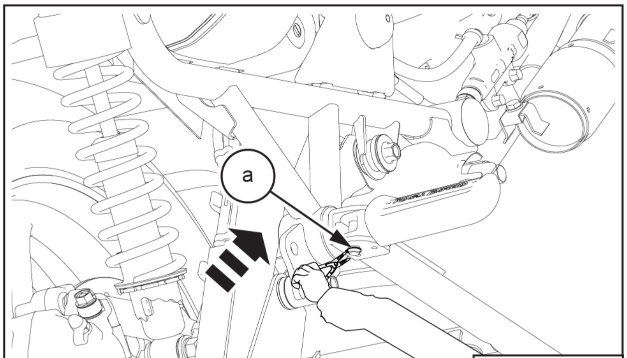

Fig. 6.4.292

🔧	Circlip expander

Side Stand Assembly

6.5.51. Side Stand

- Apply grease on the inner surface of the stand **(a).**

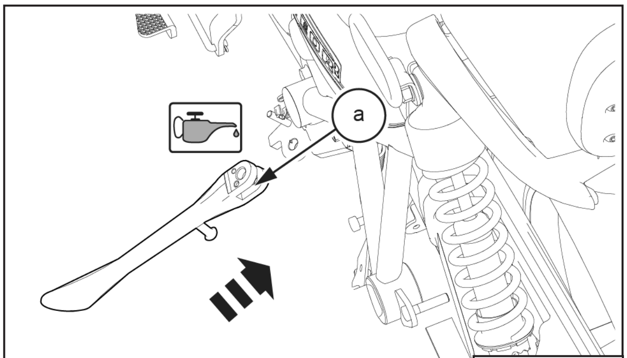

Fig. 6.4.293

- Locate the stand **(a)** in the frame **(b)**.

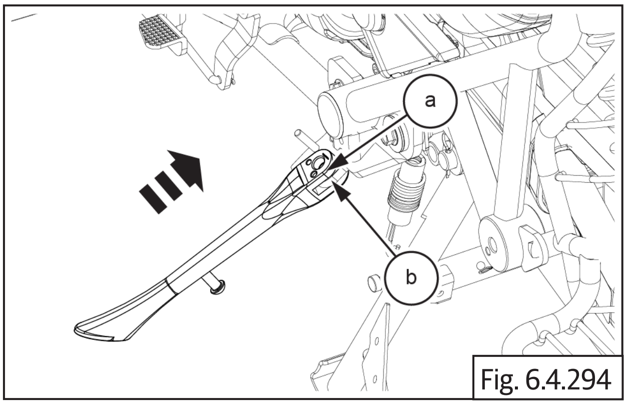

Fig. 6.4.294

- Insert bolt **(a)** into side stand along with nut **(b)**

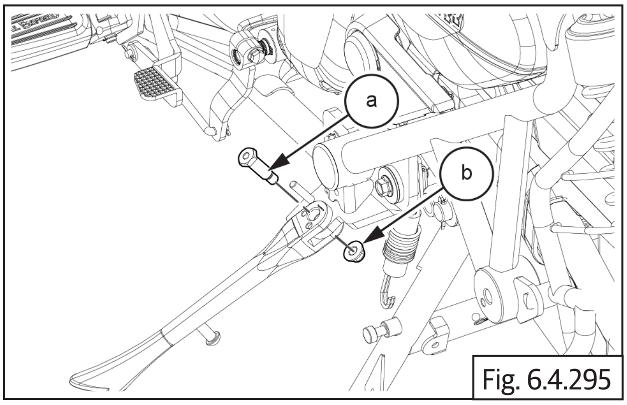

Fig. 6.4.295

- Tighten nut **(a)** at the back of the stand.

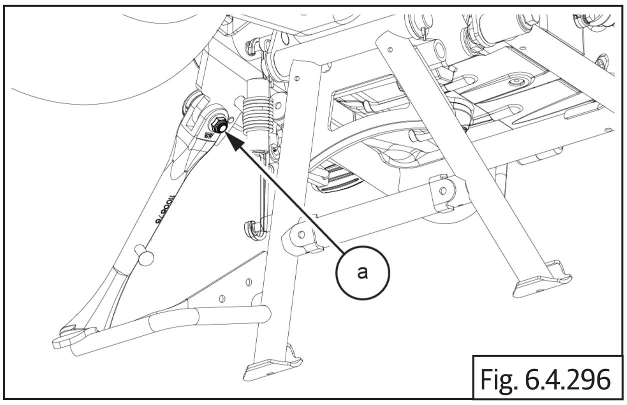

Fig. 6.4.296

🔧	12 mm Socket with Ratchet
Torque	20-30 N·m/2.0-3.0 kgf-m

- Install spring **(a)** in the side stand **(b)**.

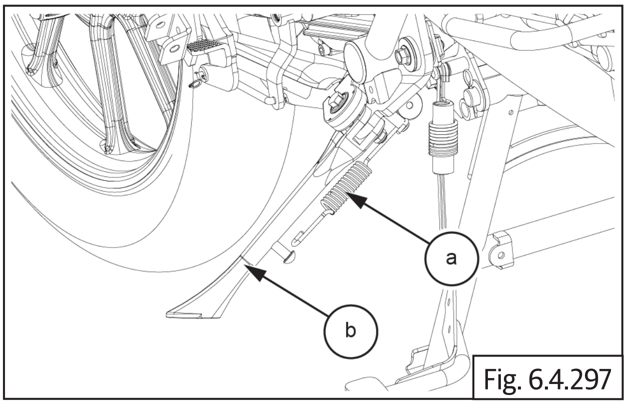

Fig. 6.4.297

🔧	Screw Driver

Saree Guard Assembly

6.5.52. Saree guard (For Indian market only)

- Locate the saree guard **(a)** at the LH side of the rear wheel.

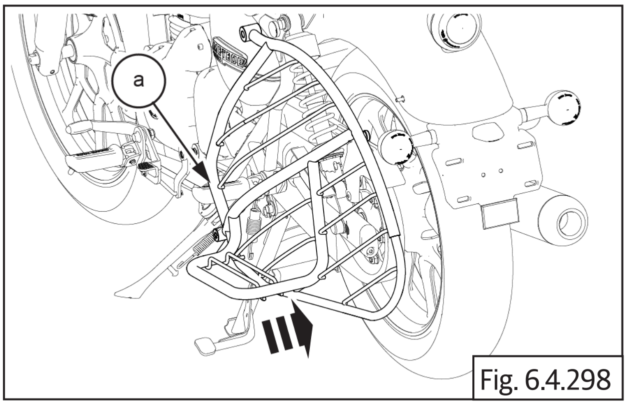

Fig. 6.4.298

- Locate and tighten 1 nos hex flange bolt **(a)** on the LH side of the frame.

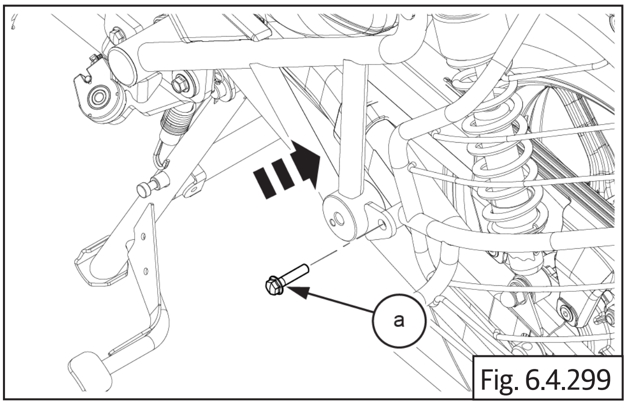

Fig. 6.4.299

🔧	12 mm socket with ratchet
Torque	10-12 N·m/1.0-1.2 kgf-m

- Mount the top hole **(a)** of the saree guard in the rear shock absorber mounting stud **(b)**.

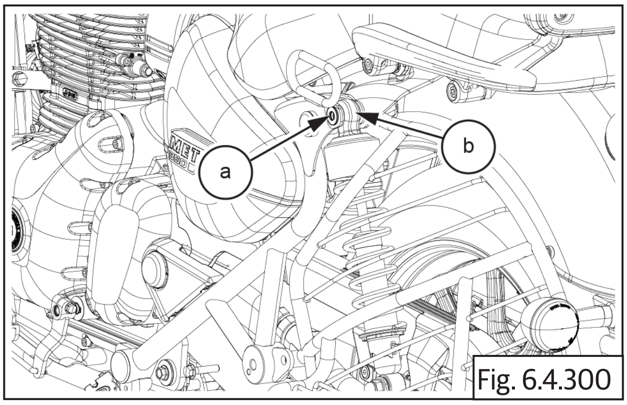

Fig. 6.4.300

- Locate shock absorber bolt **(a)** and tighten it.

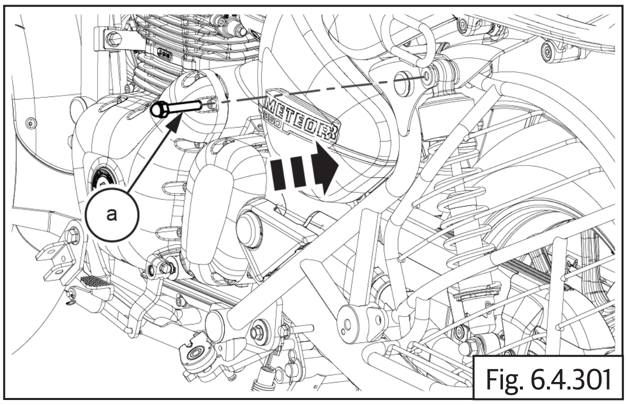

Fig. 6.4.301

🔧	17 mm socket with ratchet
Torque	20-30 N·m/20-30 kgf-m

- Locate 1 nos **(M6)** hex head bolts **(a)** in the inside of the rear mudguards and tighten it

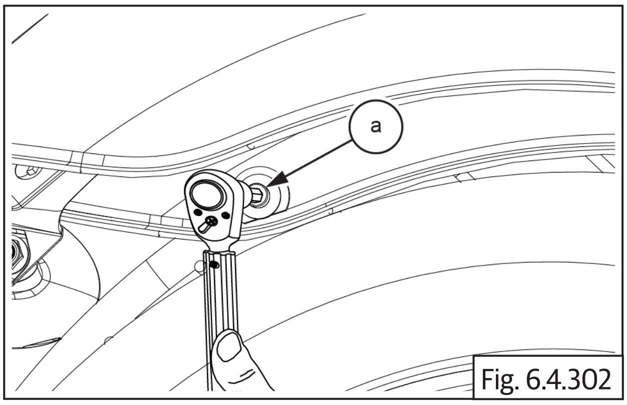

Fig. 6.4.302

🔧	10 mm socket with ratchet
Torque	10-12 N·m/1.0-1.2 kgf-m

MUDGUARDS/NUMBER PLATES/GRAB HANDLE

Mudguards/Number Plates/Grab Handle

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6.6 Mudguards/Number Plates/Grab Handle

Dismantling

6.6.1. Front Number Plate (Only for India)

- As per Government norms high security number plates will be provided which are riveted with the vehicle and cannot be removed.

6.6.2. Front Mudguard

- Loosen and remove 4 Nos. Hex socket head screw **(M6) (a)** from fork brace.

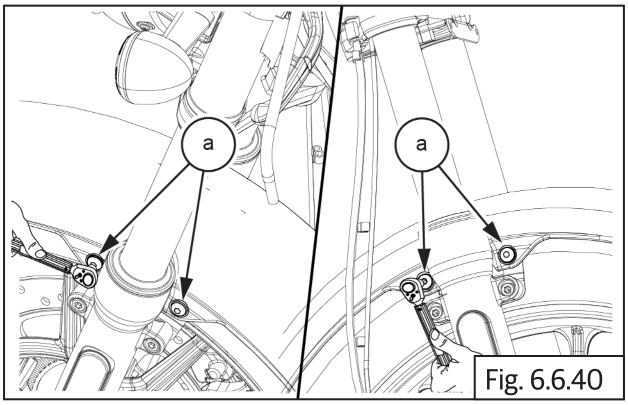


Fig. 6.6.40

5 mm Allen socket with Ratchet

- Slightly lift mudguard **(a)** upwards, tilt it to one side and remove from fork ends.

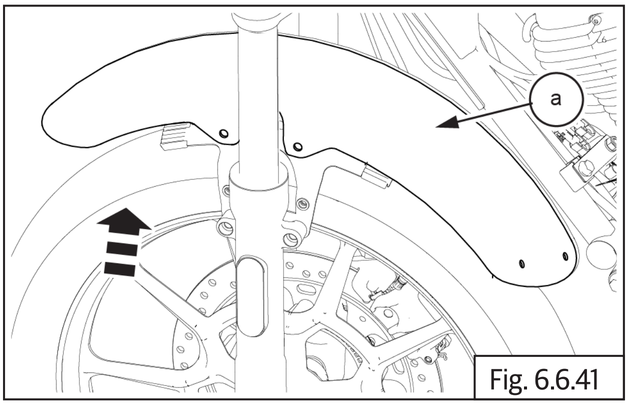
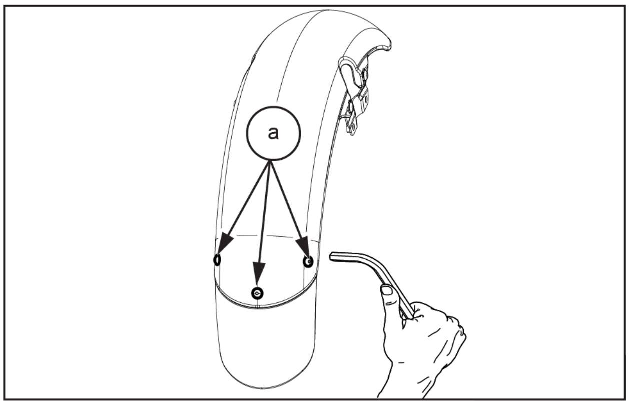


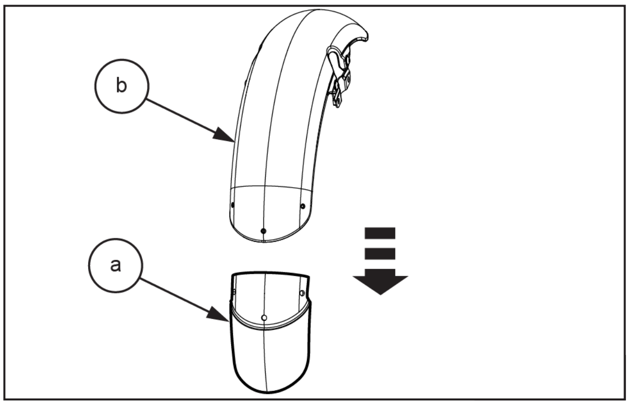
Fig. 6.6.41

- Loosen and remove 3 Nos. Hex socket bolt **(a)** from mudguard bottom.

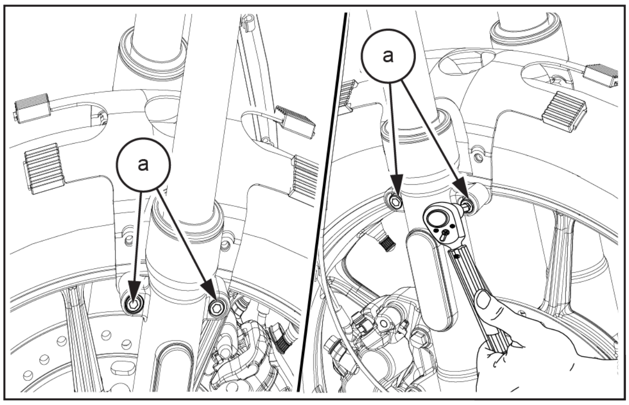


4 mm Allen socket with Ratchet

- Remove mudflap **(a)** from mudguard **(b)**.



- Loosen and remove 4 Nos. Hex socket bolt **(M8) (a)** and remove fork brace.



5 mm Allen socket with Ratchet

6.6.3. Rear Number Plate (For Indian Market)

- As per Goverment norms high security number plates will be provided which are riveted with the vehicle and cannot be removed.

6.6.4. Rear Fender

- Loosen and remove 4 Nos. **(a)** allen bolts from the inside of mudguard.

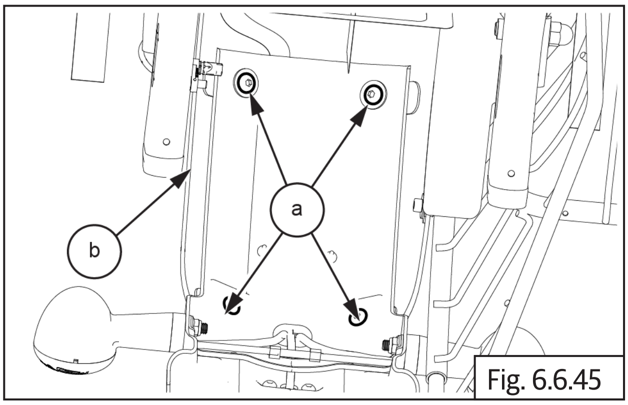


Fig. 6.6.45

🔧	5 mm Allen Key

- Seperate the fender from mudguard.
- Disconnect the electrical couplers **(a)**.

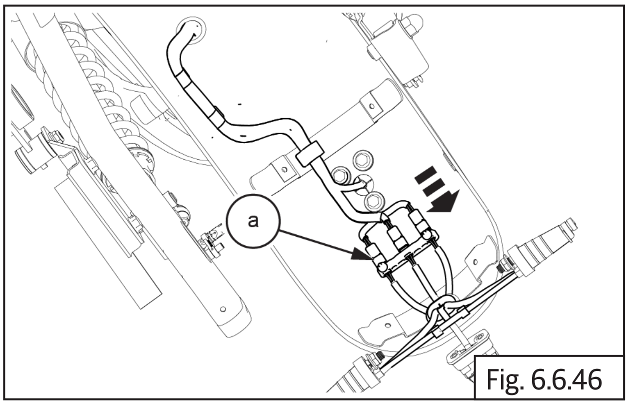


Fig. 6.6.46

6.6.5. Reflector Rear

- Loosen and remove Hex nut **(M5) (a)** along with washer from rear mudguard bottom **(b)** to remove rear reflector **(c)**.

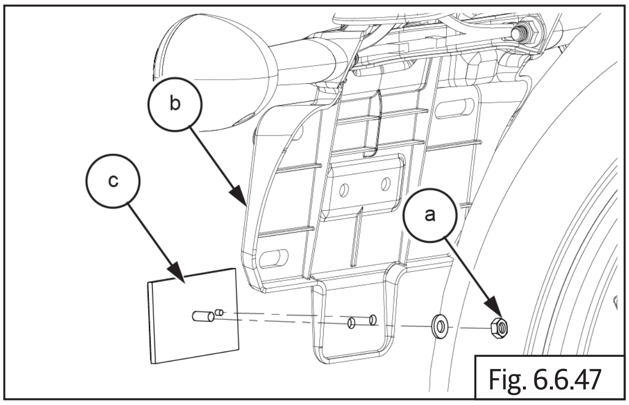


Fig. 6.6.47

🔧	6 mm Socket with Ratchet

6.6.6. Rear Mudguard

- Remove the following:
  - Rider seat (section 6.7.2).
- Loosen and remove 2 nos hex flange bolts **(M6) (a)** from the top of the mudguard.

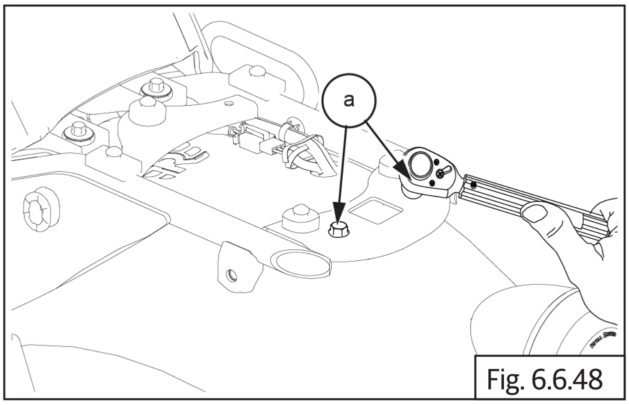


Fig. 6.6.48

🔧	10 mm Socket with Ratchet

- Loosen and remove 2 Nos. nuts **(a)** along with bolts **(b)**.

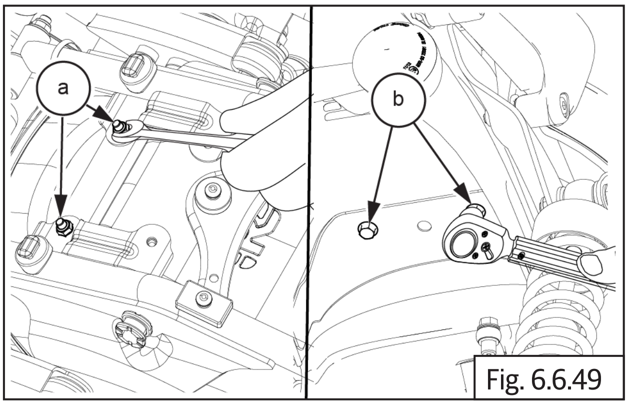


Fig. 6.6.49

🔧	10 mm Socket with Ratchet

- Disconnect tail lamp and trafficator connectors **(a)** from wiring harness.

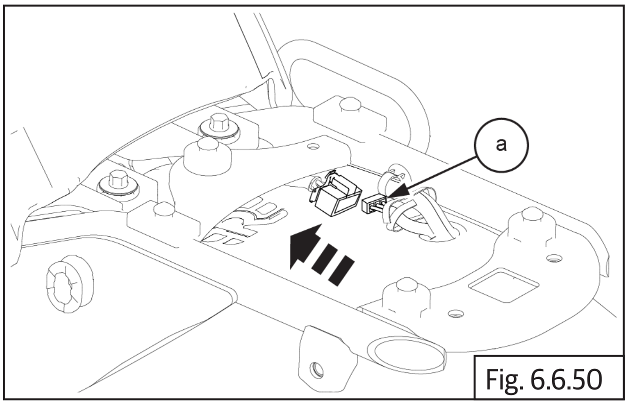


Fig. 6.6.50

- Remove mudguard **(a)**.

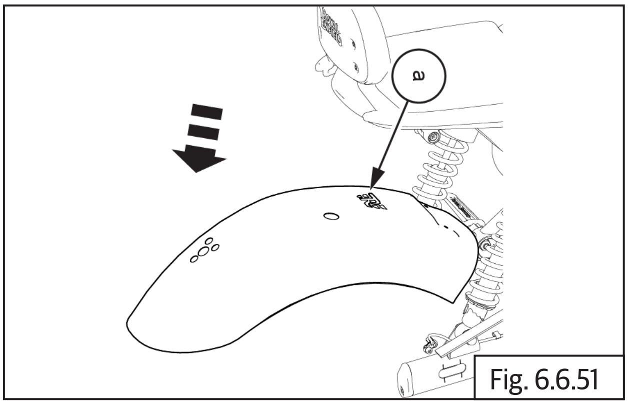


Fig. 6.6.51

Inspection

Mudguard/Reflector/Grab handle

- Clean Mudguard. Inspect for any scratches, cracks, damages on mudguard and replace if required.
- Inspect Infill rear mud cover for any cracks or damages. Replace if required.
- Inspect rear reflector for any cracks or damages. Replace if required.
- Inspect grab handle for any cracks, bends or damages and replace if required.

Front and Rear number plates

- Inspect number plates and bracket for rust formation and cracks. Replace if required.

Assembly

6.6.9. Rear Mudflap

- Locate and connect the trafficator couplers **(a)**.

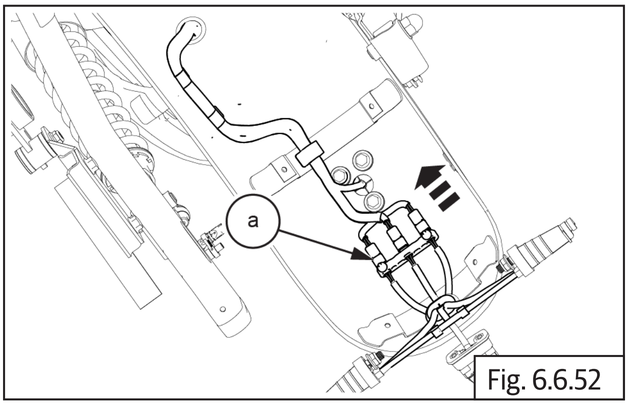


Fig. 6.6.52

- Locate the coupler **(a)** in the rubbers provided in rear mudflap.

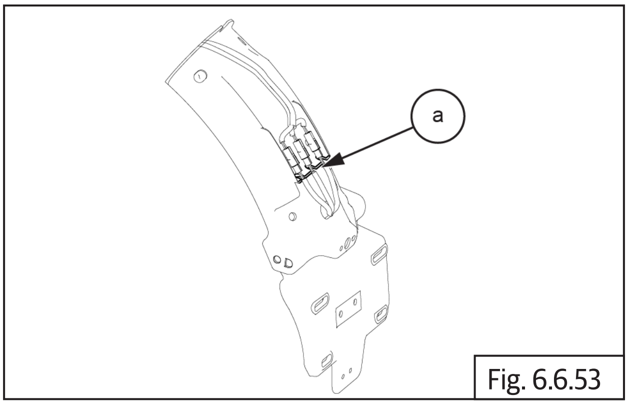


Fig. 6.6.53

- Locate the rear mudflap into mudguard and ensure the mounting holes are aligned.

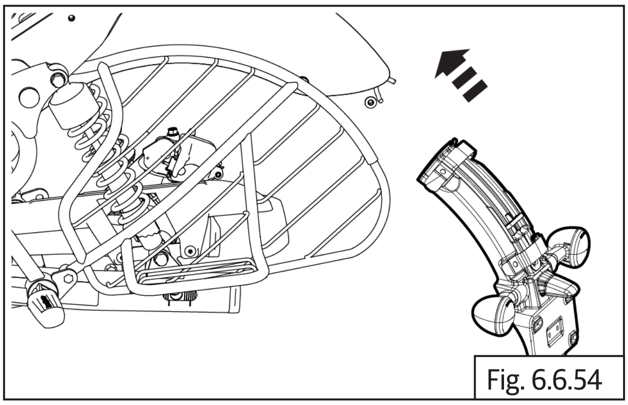


Fig. 6.6.54

- Insert and tighten 4 Nos. hex bolts **(M6) (a)** along with washers into mud guard **(b)**.

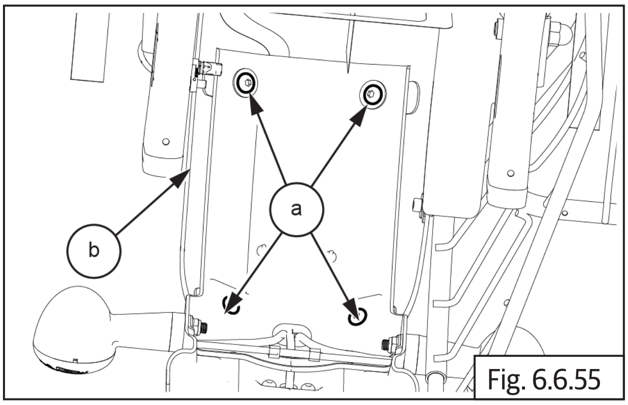


Fig. 6.6.55

🔧	5 mm Allen Key
Torque	10 N-m/1.0 kgf-m

6.6.11. Rear Mudguard

⚠ CAUTION

DO NOT over tighten bolts and nuts as it may crack or break the plastic parts and cause vibration and noise while driving.

- Route the tail lamp wiring harness **(a)** into rear mudguard **(b)** and secure with rubber clip.

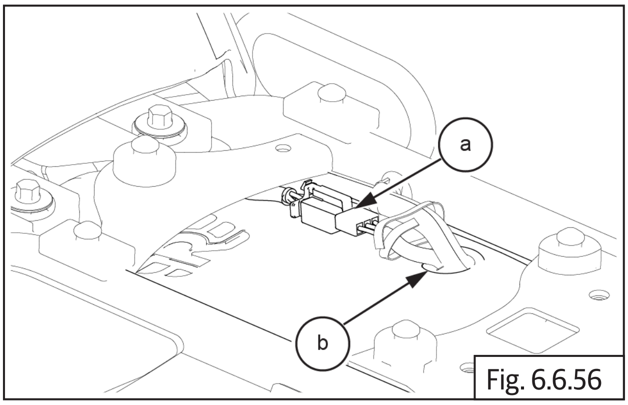


Fig. 6.6.56

- Locate the rear mudguard **(a)** into frame and ensure the mounting holes are aligned.

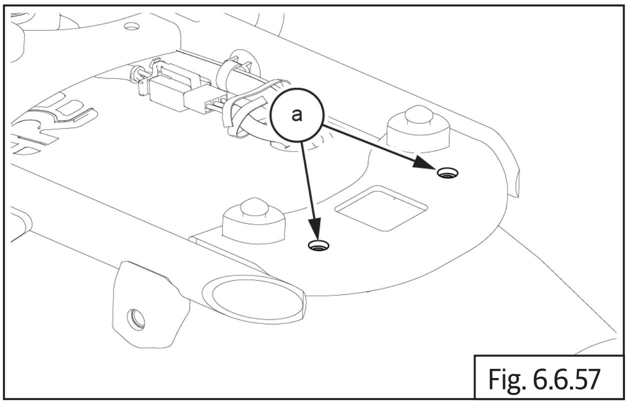


Fig. 6.6.57

- Insert and tighten 2 Nos. Hex bolts **(M6) (a)** into frame bracket **(b)**.

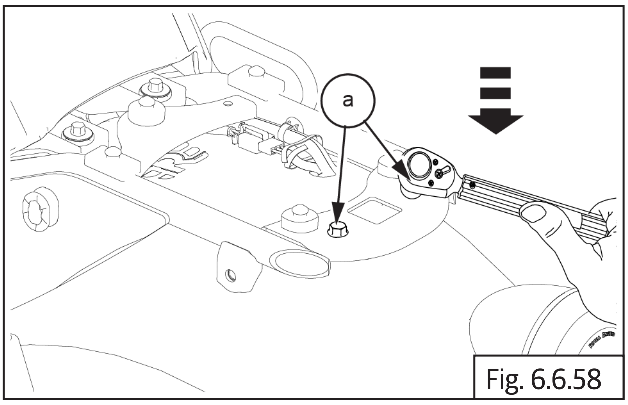


Fig. 6.6.58

🔧	10 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Insert and tighten 2 Nos. Hex flange bolts **(M6) (a)** from rear mudguard to frame.

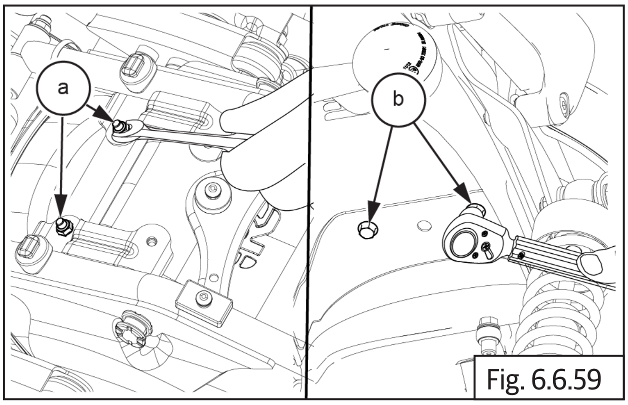


Fig. 6.6.59

🔧	10 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Connect tail lamp connector **(a)** into wiring harness.

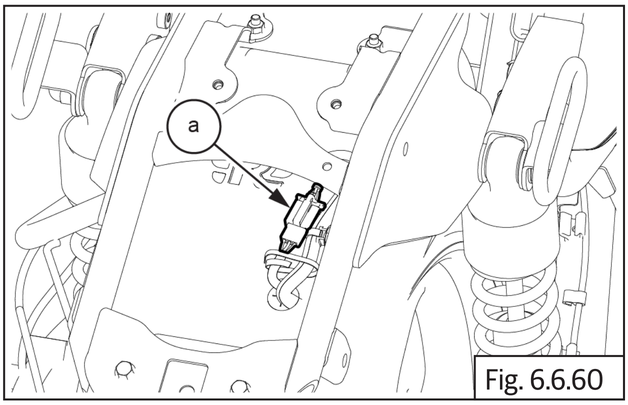


Fig. 6.6.60

6.6.12. Reflector

- Locate reflector **(c)** into rear mudflap guide **(b)** hole and tighten Hex nut **(M4) (a)** along with washer.

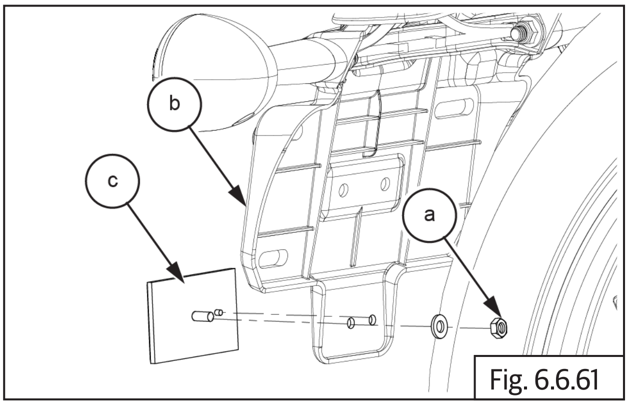


Fig. 6.6.61

🔧	6 mm Socket with Ratchet
Torque	3-5 N-m/0.3-0.5 kgf-m

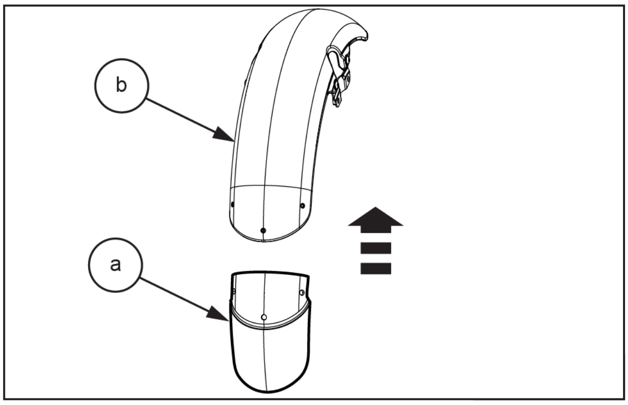
6.6.13. Rear Number Plate (For Indian Market)

- As per Goverment norms high security number plates will be provided which are riveted with the vehicle and cannot be removed.

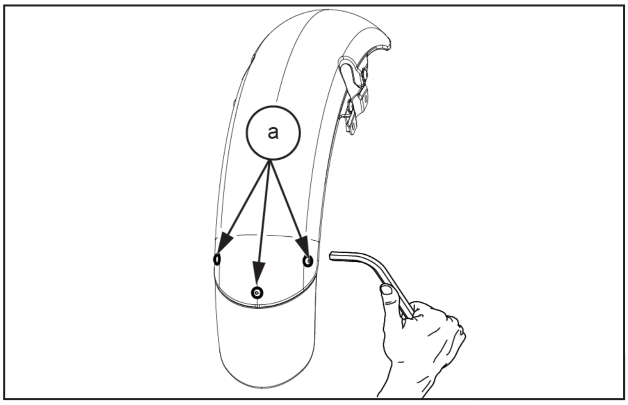
6.6.15. Front Mudguard

NOTE
Do not over tighten bolts and nuts into mudflaps and mudguards, it may crack or break the plastic parts and cause noise or vibration while driving.

- Locate mudflap **(a)** on mudguard **(b)**.



- Locate and tighten 3 Nos. Hex socket bolt **(a)** into mudguard bottom.



🔧	4 mm Allen socket with Ratchet

- Locate fork brace onto fork assembly and tighten 4 Nos. Hex socket button head screws **(M8) (a)**.

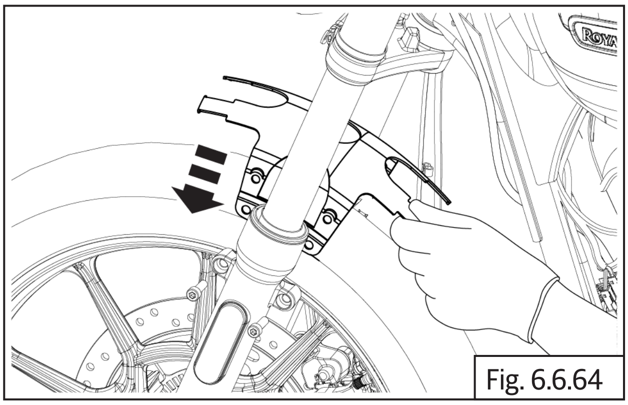


Fig. 6.6.64

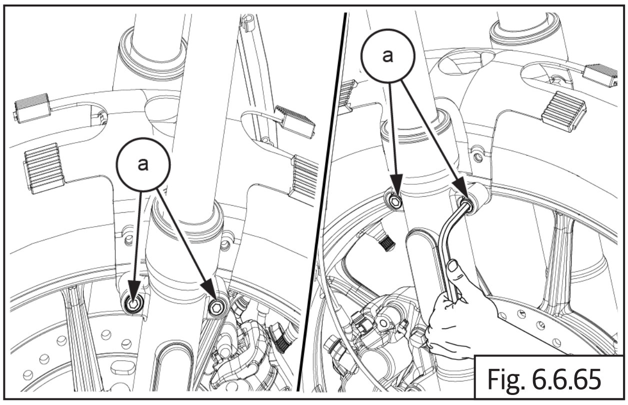


Fig. 6.6.65

🔧	6 mm Allen socket with Ratchet
Torque	20-30 N-m/2.0-3.0 kgf-m

- Ensure handlebar is turned to one side, tilt front mudguard and insert between the fork legs.
- Locate and tighten 4 Nos. Hex flange bolts **(M6) (a)** and fix mudguard in to fork.

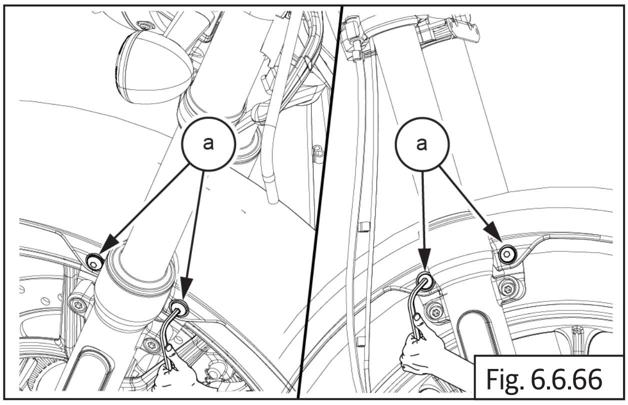


Fig. 6.6.66

🔧	5 mm Allen socket with Ratchet
Torque	8-10 N-m/0.8-1.0 kgf-m

6.6.16. Front Number Plate (For Indian Market)

- As per Goverment norms high security number plates will be provided which are riveted with the vehicle and cannot be removed.

SIDE PANELS AND RIDER SEAT

Side Panels and Rider Seat

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6.7 Side Panels and Rider Seat

Dismantling

6.7.1. Side Panel RH

- Insert ignition key **(a)** and turn clockwise to unlock and remove side panel RH **(b)** from motorcycle.

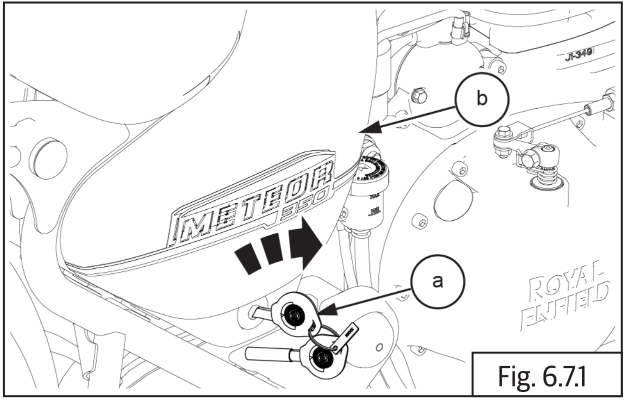
b
a
METEOR 350
ROYAL ENFIELD

Fig. 6.7.1

- Gently pull the RH cover **(a)** to remove.

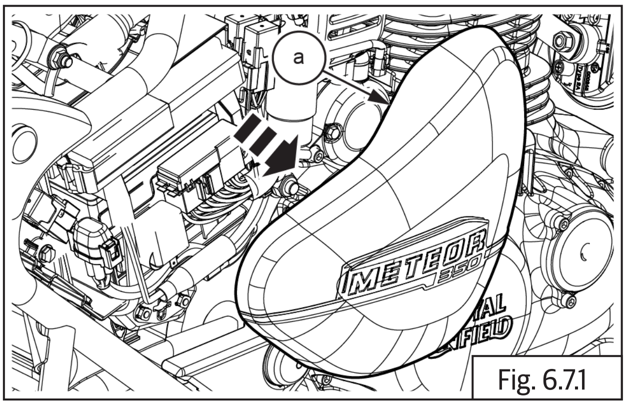
a
METEOR 350

Fig. 6.7.1

6.7.2. Side Panel LH

- Loosen and remove bolts **(a)**.

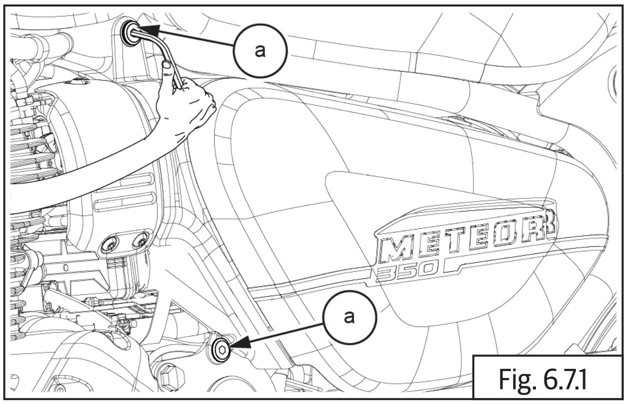
a
METEOR 350
a

Fig. 6.7.1

🔧	5 mm Allen Key

- Gently pull the LH cover **(a)** to remove.

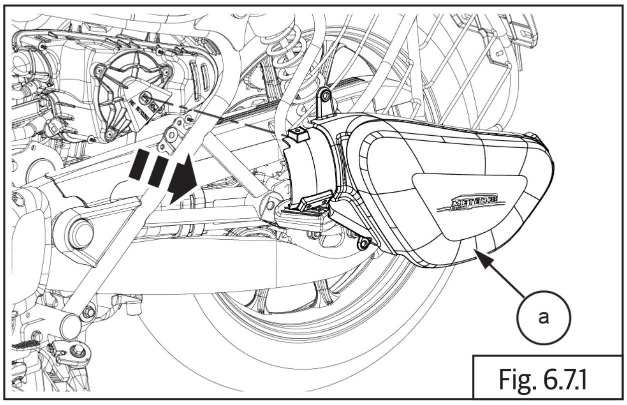

Fig. 6.7.1

6.7.3. Pillion Backrest and Seat from Frame

- Locate and remove 4 Nos hex soc bolts **(M6) (a)** behind the backrest.

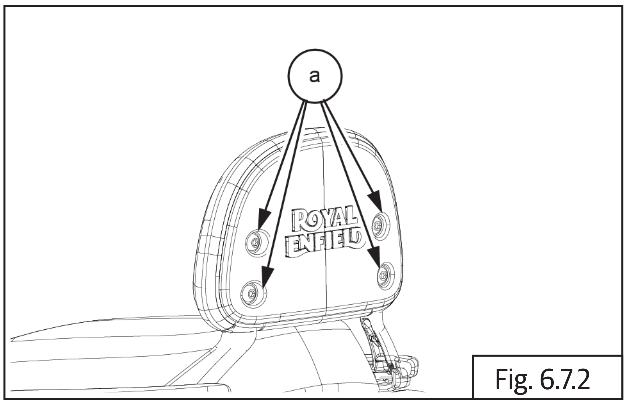

Fig. 6.7.2

🔧	5 mm Allen Key

- Remove backrest pad **(b)** along with the supporting pad **(a)** behind the backrest.

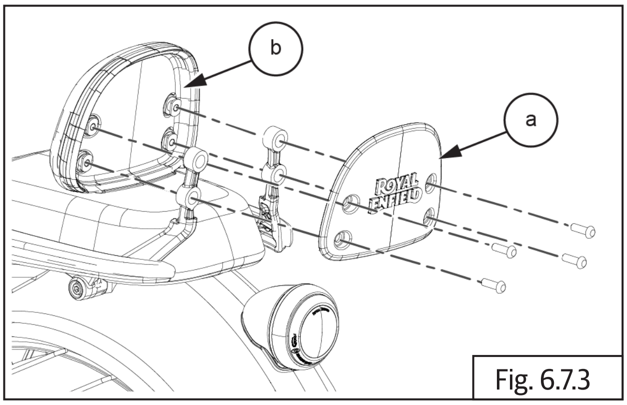

Fig. 6.7.3

- Locate and remove 4 Nos hex soc bolts **(M8) (a)** below the pillion seat.

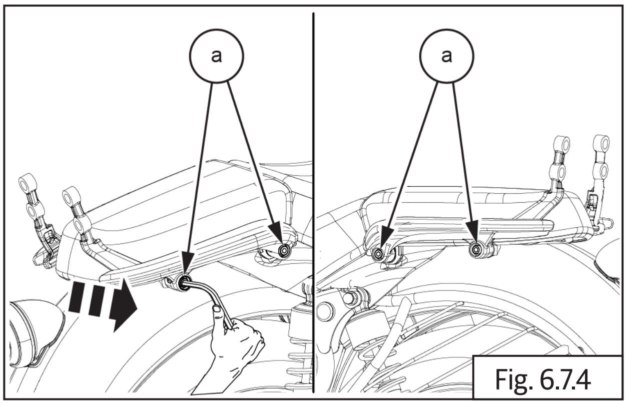

Fig. 6.7.4

🔧	6 mm Allen Key

- Remove the grab rail **(a)**.

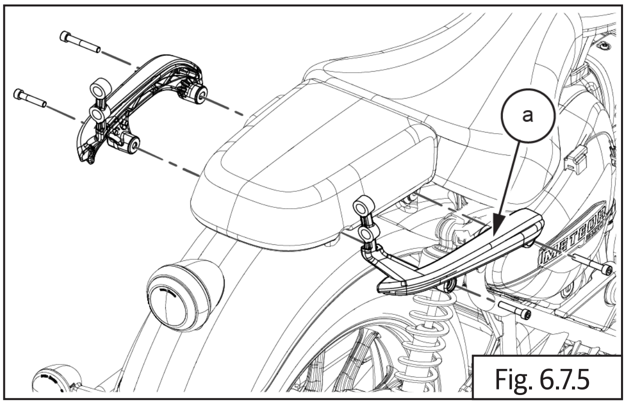

Fig. 6.7.5

- Gently hook the pillion seat sideways **(a)** to remove.

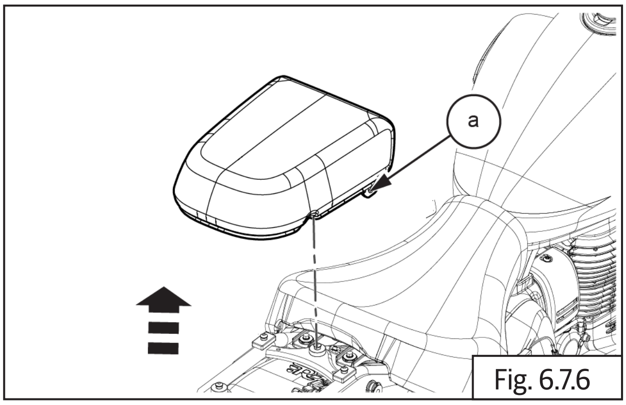

Fig. 6.7.6

6.7.4 Rider Seat from Frame

- Remove 2 Nos Hex flange bolt **(a) (M6)** along with spacer **(b)** and gromet **(c)**.

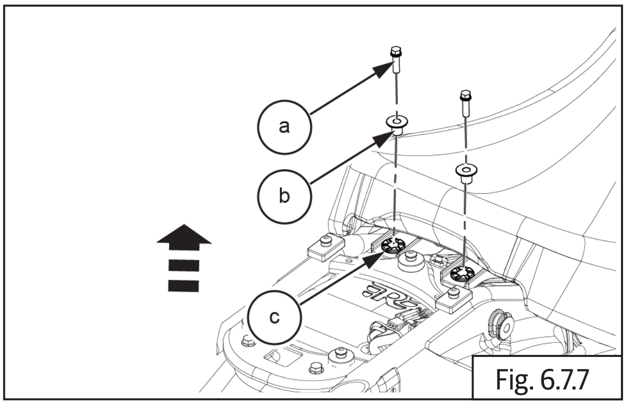

Fig. 6.7.7

- Gently lift and pull rider seat **(a)** from rear side of motorcycle.

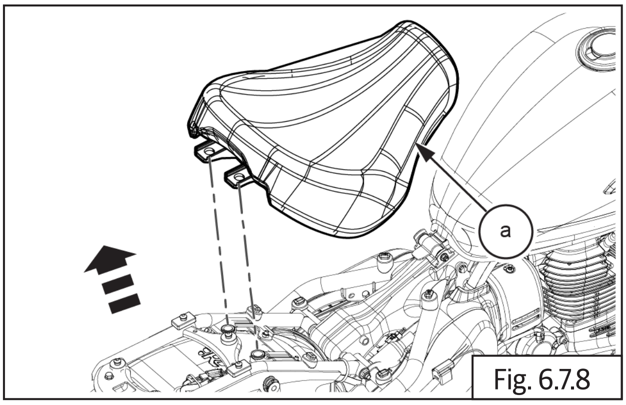

Fig. 6.7.8

NOTE
- *Place the seat in a safe location to prevent from scratches and dirt.*

Assembly

6.7.5. Rider Seat Assembly on Frame

- Ensure mounting holes **(a)** of the seat are aligned with frame.

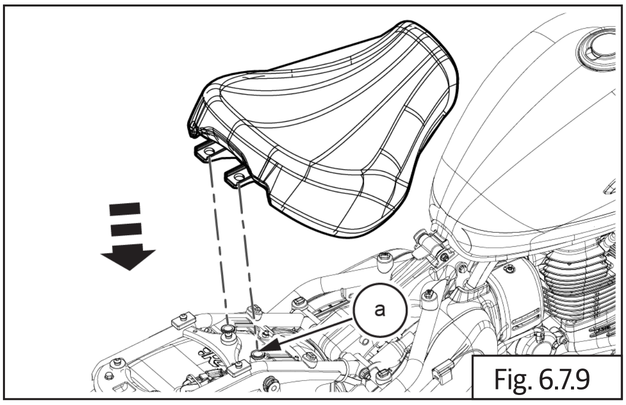

Fig. 6.7.9

- Place the gromet **(a)** and spacer **(b)** over the grove and insert bolts **(c)** and tighten it.

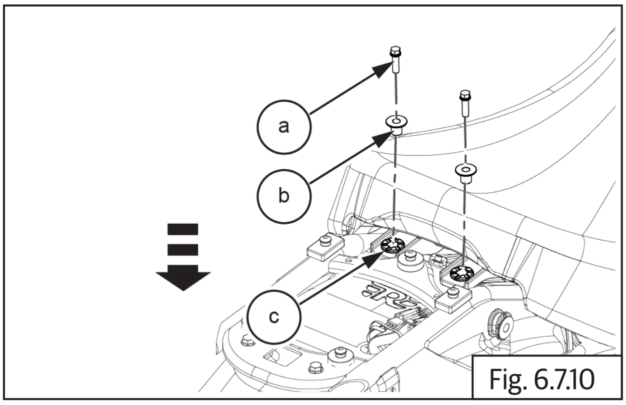

Fig. 6.7.10

🔧	10 mm Socket with Ratchet
Torque	8-12Nm/0.8-1.2Kg-ft

6.7.6. Pillion Backrest and Seat Assembly on Frame

- Locate the pillion seat **(a)** by hooking it sideways over the frame.

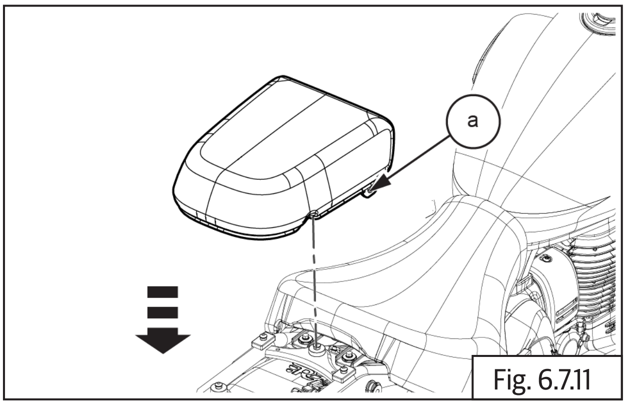

Fig. 6.7.11

- Locate the grab rail **(a)** over the pillion seat and make sure the holes are aligned.

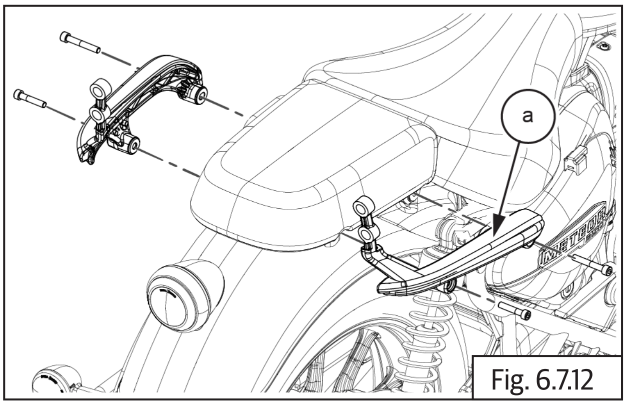

Fig. 6.7.12

- Insert the bolts **(a)** and tighten it.

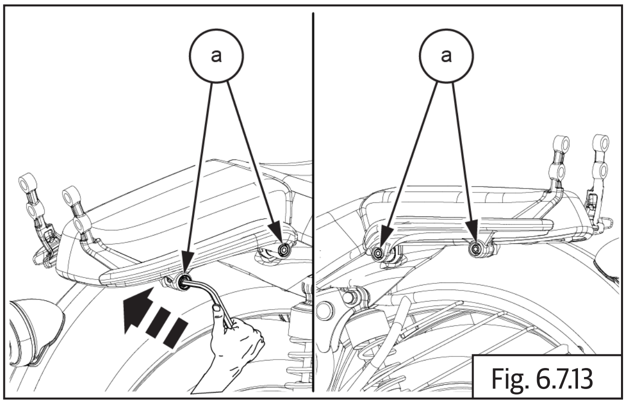

Fig. 6.7.13

🔧	6 mm Allen Socket with Ratchet

- Align the back **(a)** and front **(b)** pad of backrest with mounting holes. .

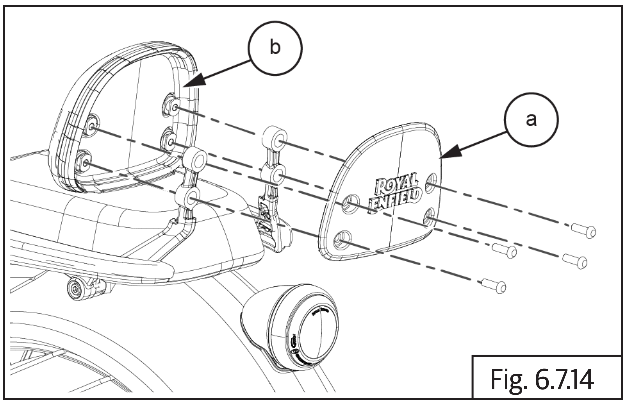
b
a
ROYAL ENFIELD

Fig. 6.7.14

- Insert mounting bolts **(a)** and tighten it.

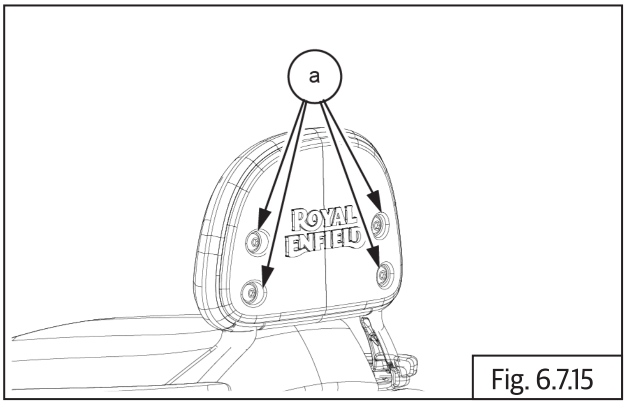
a
ROYAL ENFIELD

Fig. 6.7.15

🔧	5 mm Allen Socket with Ratchet

6.7.7. Side Panel LH

- Locate LH panel from bottom to fit into frame **(a)**.

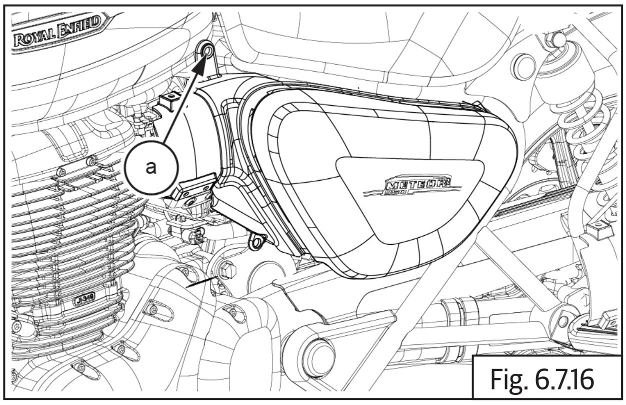
ROYAL ENFIELD
a
METEOR

Fig. 6.7.16

- Locate LH side panel fitting bolts **(a)** and tighten.

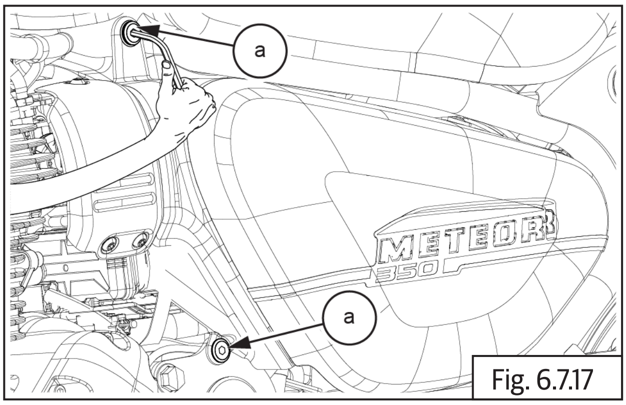
a
METEOR 350
a

Fig. 6.7.17

🔧	5 mm Allen Key

6.7.8. Side Panel RH

- Locate side panel RH into frame and lock in its position.
- Insert ignition key **(a)** into side panel RH **(b)** and turn in anticlockwise direction to lock RH side panel.

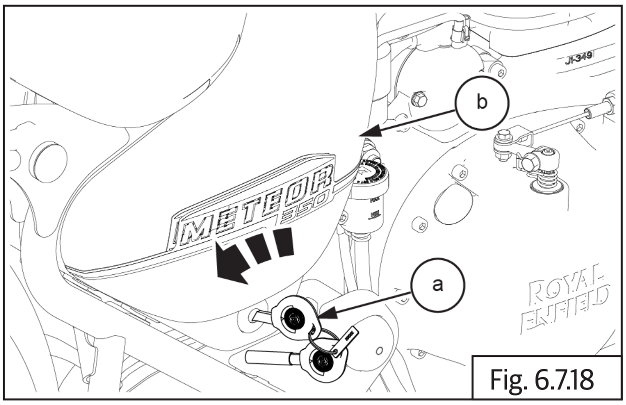
b
a
METEOR 350
ROYAL ENFIELD

Fig. 6.7.18

WHEELS

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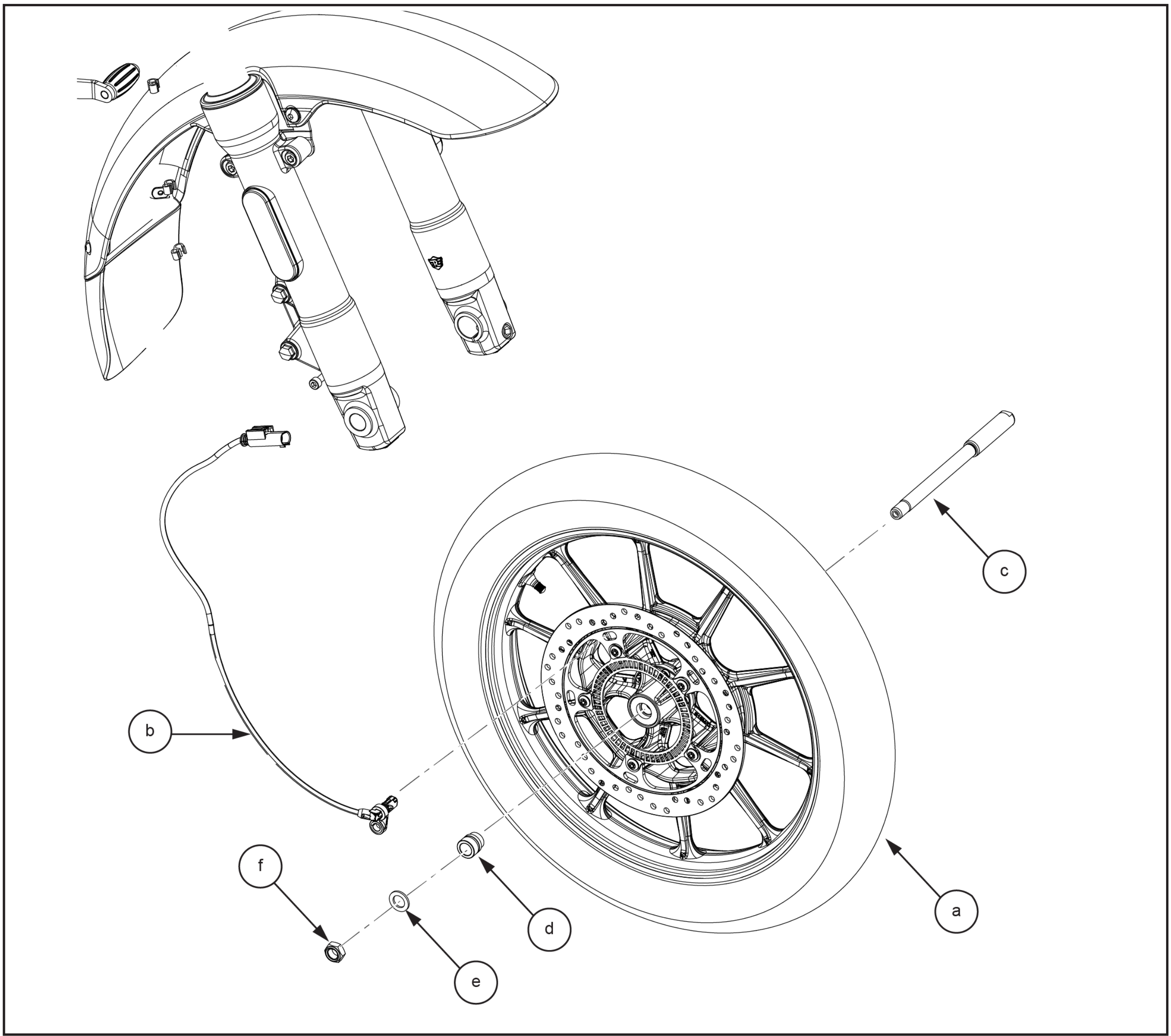
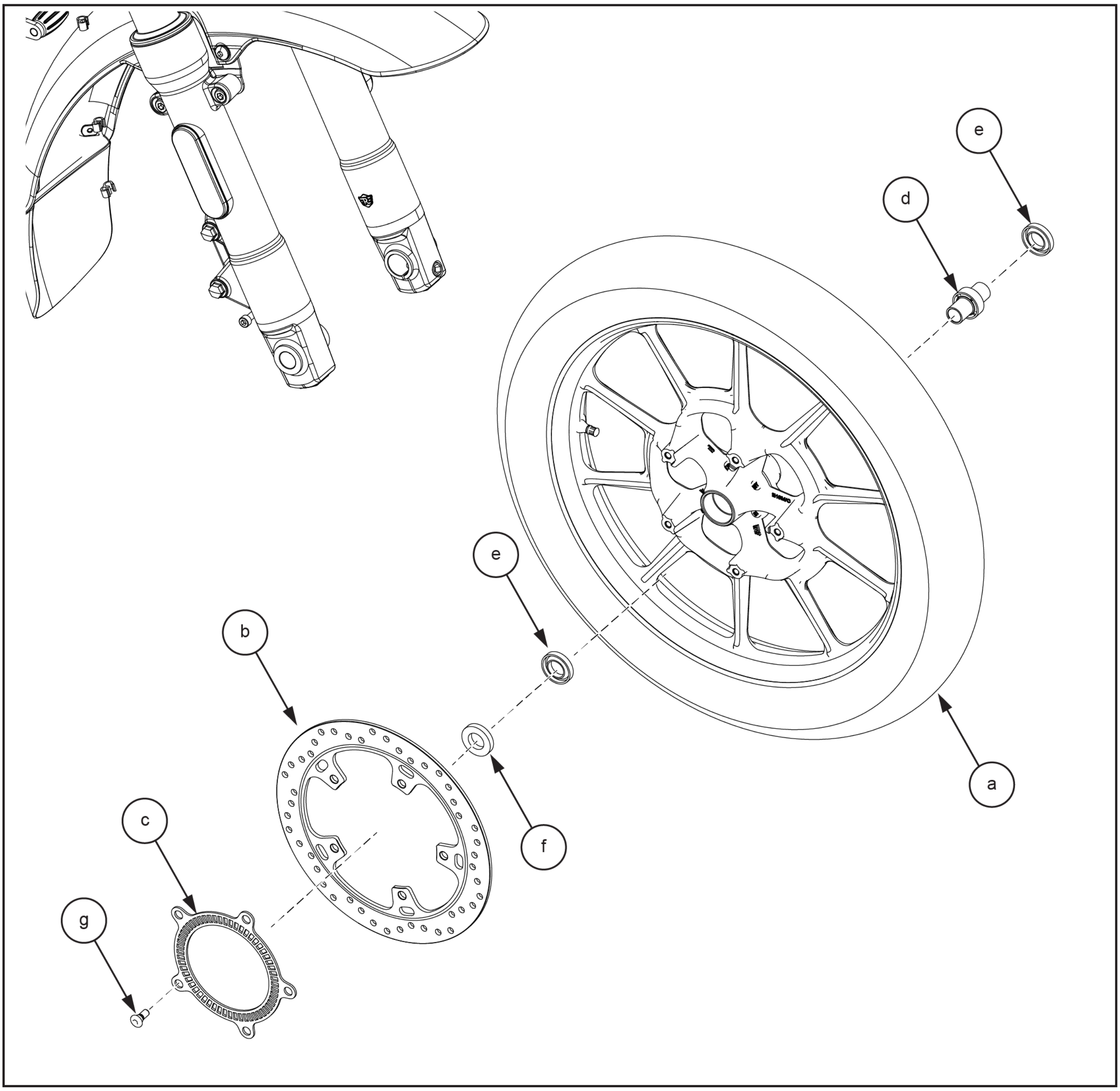
Front Wheel Assembly



Item No.	Description	Quantity
a	Wheel	1
b	Wheel Speed Sensor	1
c	Spindle	1
d	Spacer	1
e	Plain Washer	1
f	Spindle Nut	1

Front Wheel and Brake Disc



Item No.	Description	Quantity
a	Wheel	1
b	Brake Disc	1
c	Toner Wheel Front	1
d	Spacer, wheel	1
e	Wheel Bearing	2
f	Grease Seal	1
g	Hex Soc Screw M8	5

6.8 Wheels

Dismantling

6.8.1. Front Wheel Assembly

⚠ CAUTION
Ensure the motorcycle is upright on a firm and flat surface.

- Locate a scissor jack **(a)** under the cradle frame **(b)** and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm).

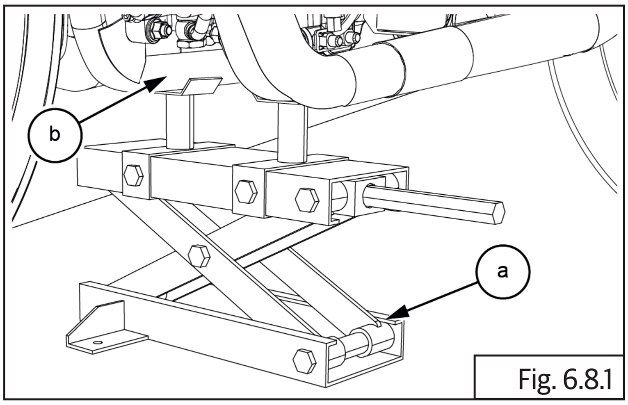


Fig. 6.8.1

- Loosen Hex socket head bolt **(M8) (a)** from front fork assembly RH.

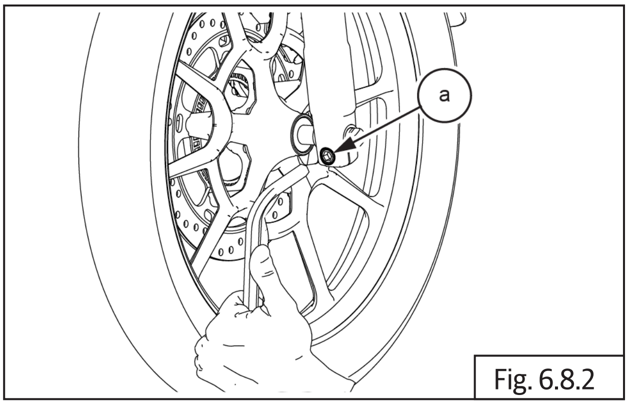


Fig. 6.8.2

🔧	5 mm Allen key

- Hold spindle **(a)** with spanner and remove Hex nut **(M16) (b)** along with washer **(c)** from RH.

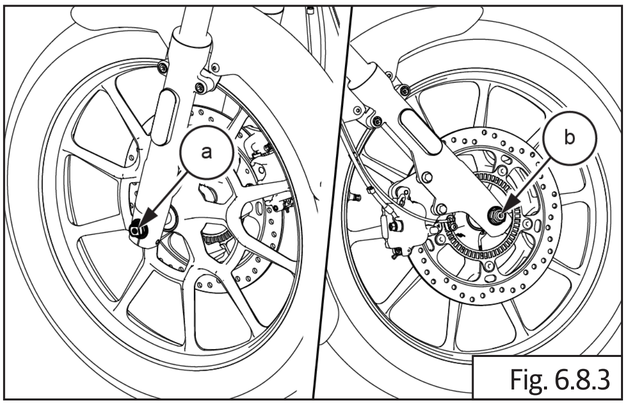


Fig. 6.8.3

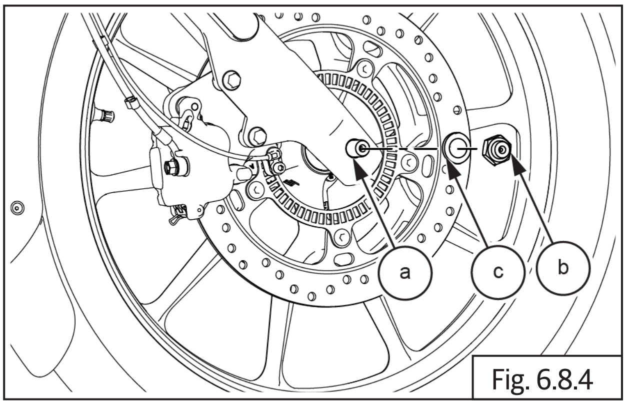


Fig. 6.8.4

🔧	24 mm Socket with Ratchet and 17 mm open end spanner

- Gently tap spindle **(a)** using mallet **(b)** from RH.

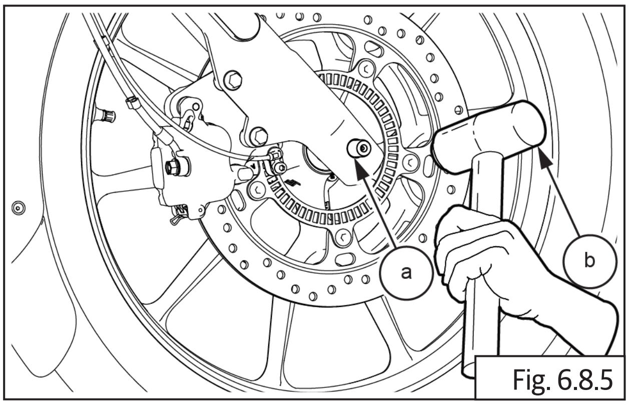


Fig. 6.8.5

🔧	Mallet

- Gently remove spindle **(a)** from wheel hub and front fork assembly LH.

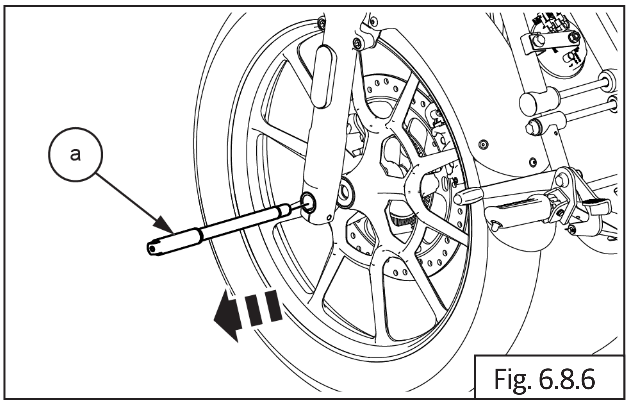


Fig. 6.8.6

⚠ CAUTION

Ensure the wheel speed sensor cable does not get stretched and damaged. Support wheel from bottom while removing spindle.

- Gently lower the wheel **(a)** such that it comes out of the fork legs **(b)**.

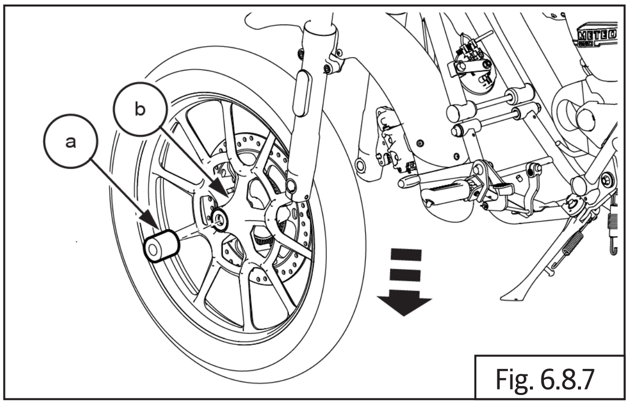


Fig. 6.8.7

- Remove spacer **(a)** from wheel hub **(b)** on LH.

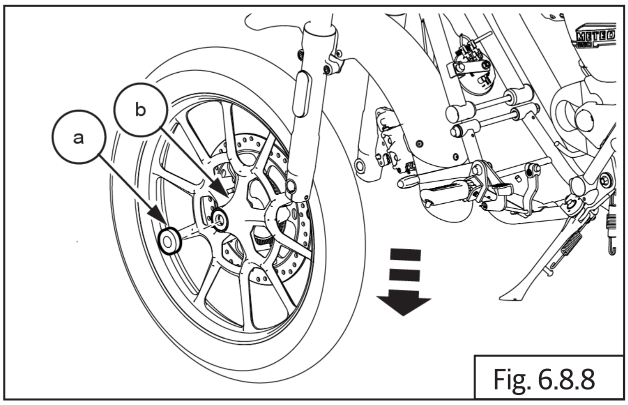


Fig. 6.8.8

6.8.2. Front Wheel and Brake Disc

⚠ WARNING

DO NOT place/store the wheel with disc facing downward. It will damage and change disc warpage.

⚠ CAUTION

Place a soft cloth under the wheel hub center mounting hole area to prevent damage.

Please loosen thread sealant applied screws with care.

- Loosen and remove 5 Nos. Hex socket head bolts **(M8) (a)** holding disc plate to hub, in crisscross pattern.

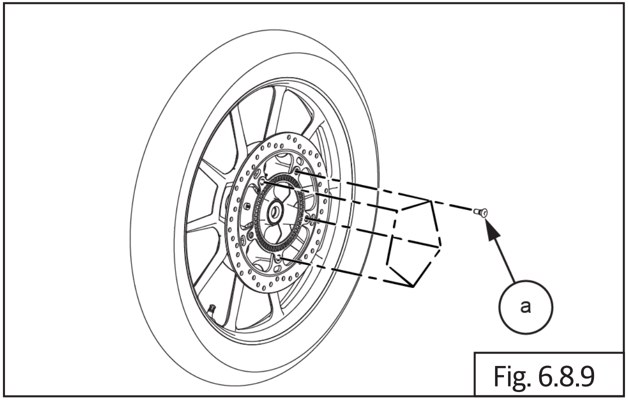


Fig. 6.8.9

🔧	6 mm Allen socket with Ratchet

- Remove toner wheel front **(a)** from hub and store carefully.

⚠ CAUTION

Avoid any bends or damages to the toner wheel as it will affect the functioning of ABS.

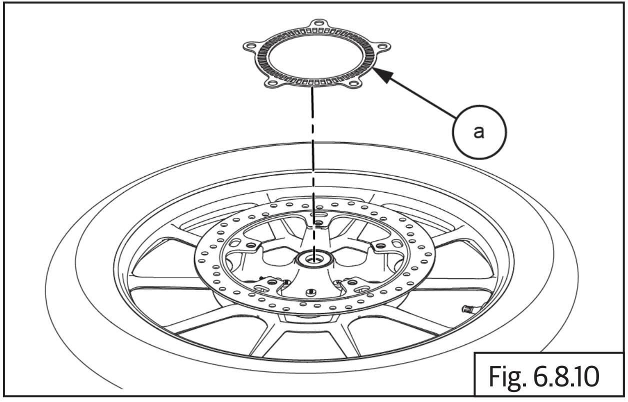


Fig. 6.8.10

- Remove front brake disc **(a)** from hub and store carefully.

⚠ CAUTION
Ensure the brake disc does not get damaged as it will affect the brake efficiency.

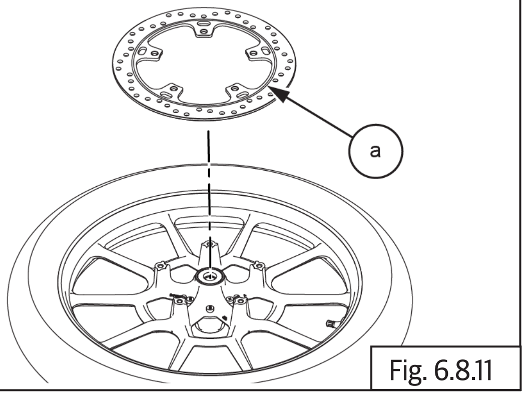


Fig. 6.8.11

- Remove grease seal **(a)** from LH.

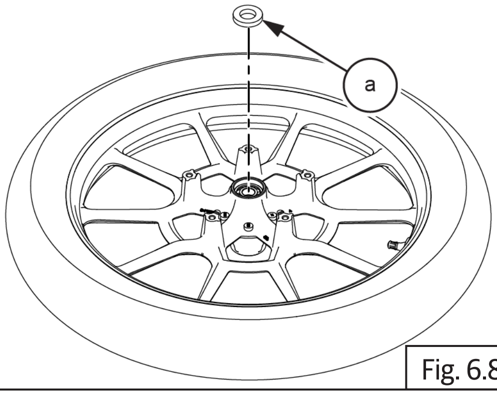
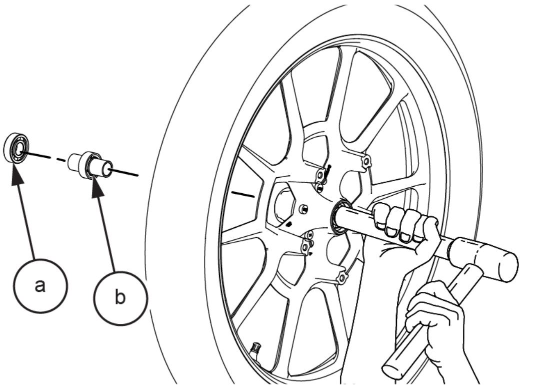


Fig. 6.8.12

- Locate a suitable pointed punch on spacer from RH of hub to remove bearing LH **(a)** along with spacer **(b)**.



🔧	Punch and Mallet

- Insert a punch into hub from LH side and drive out bearing RH **(a)**.

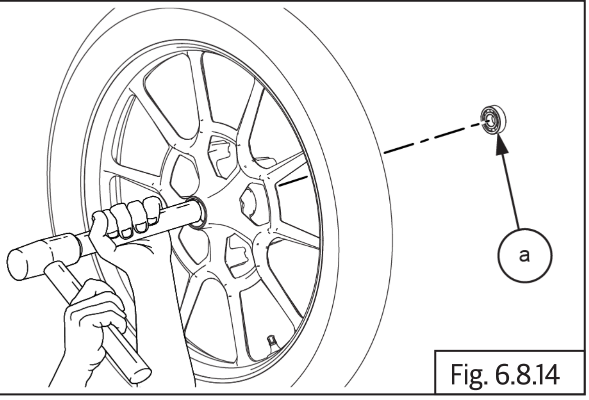
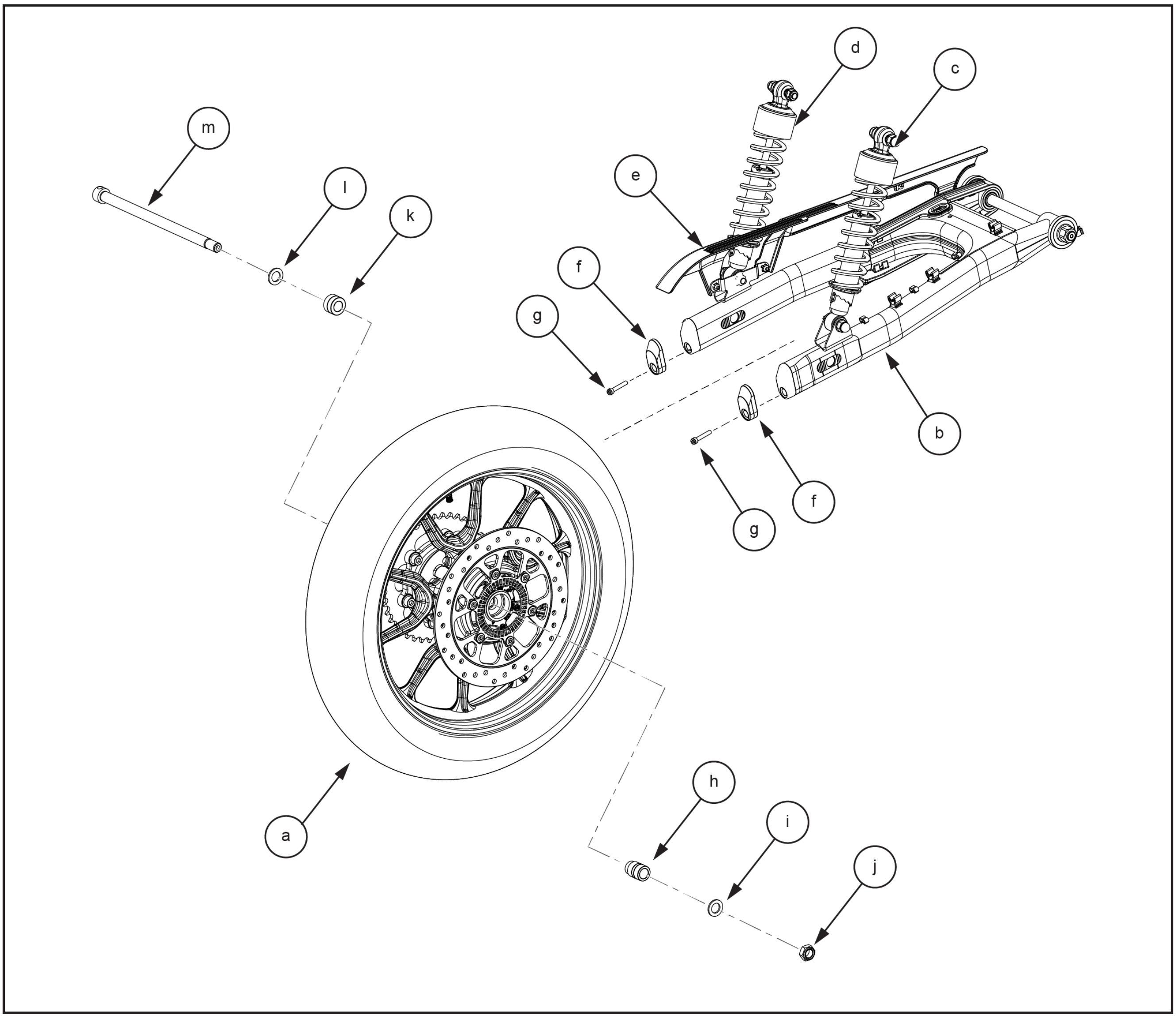


Fig. 6.8.14

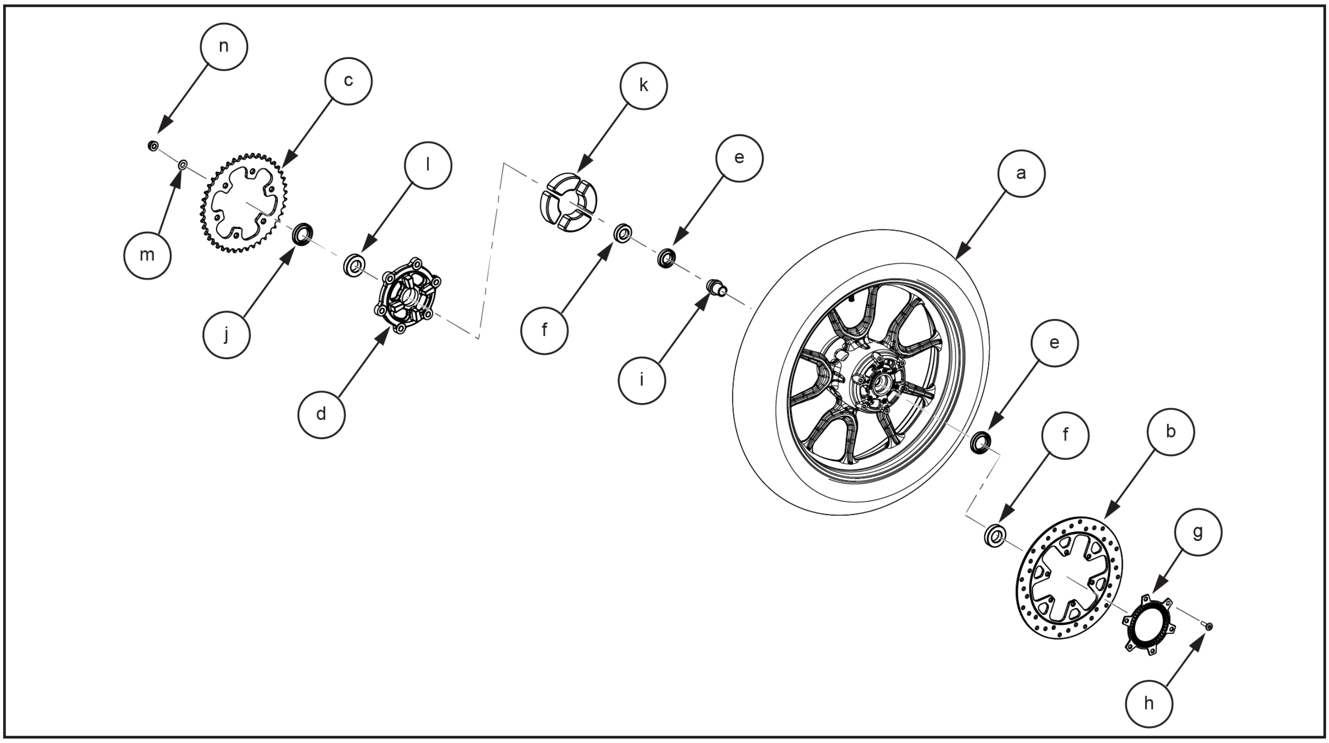
🔧	Punch and Mallet

Rear Wheel Assembly



Item No.	Description	Quantity	Item No.	Description	Quantity
a	Wheel	1	g	Chain Adjuster Bolt	2
b	Swingarm	1	h	Spacer RH	1
c	Shock Absorber RH	1	i	Plain Washer	1
d	Shock Absorber LH	1	j	Spindle Nut	1
e	Chain Protector	1	k	Spacer, Wheel	1
f	Chain Adjuster	2	l	Plain Washer	1
			m	Spindle	1

Rear Wheel and Brake Disc



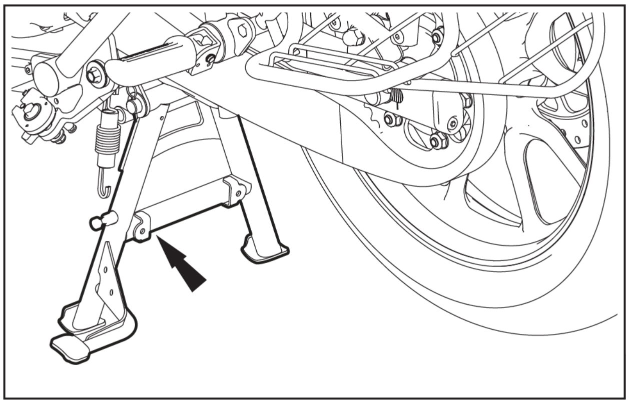
Item No.	Description	Quantity
a	Wheel	1
b	Brake Disc	1
c	Sprocket, Driven	1
d	Sprocket Carrier	1
e	Wheel Bearing	2
f	Grease Seal	2
g	Toner Wheel	1
h	Hex Soc Screw	6
i	Spacer	1
j	Dust Seal	1
k	Cush Rubber	4
l	Sprocket Bearing	1
m	Washer	6
n	Nut	6

6.8.3. Rear Wheel from Swing Arm

CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Position the vehicle in main stand. Make sure it is located in a flat surface.



- Loosen and remove Hex axle nut **(M16) (b)** from RH and hold other side LH with tommy bar **(a)**.

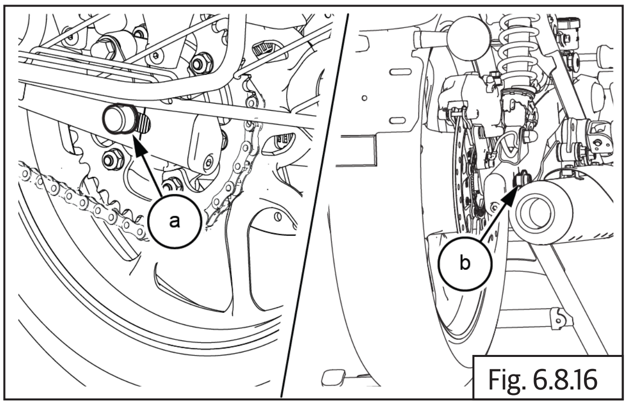


Fig. 6.8.16

	24 mm Ring spanner and Tommy bar

- Remove washer **(a)** from spindle **(b)** on swing arm RH.

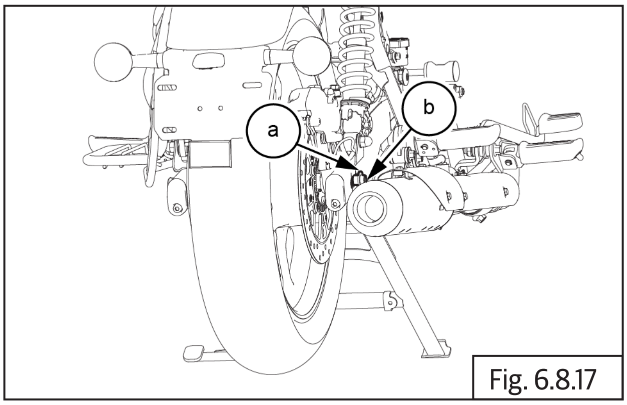


Fig. 6.8.17

- Loosen Allen bolt **(M10) (a)** on both LH and RH chain adjusters.

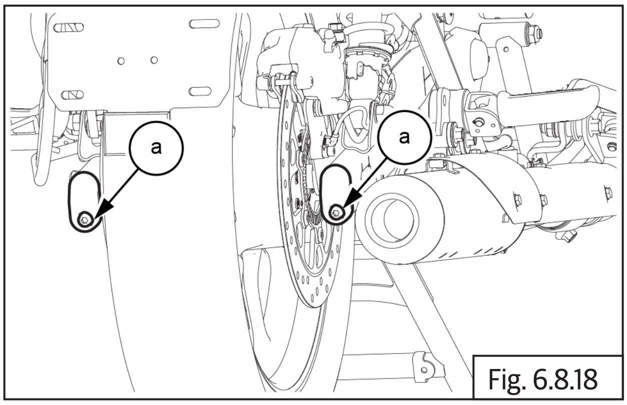


Fig. 6.8.18

	8 mm Allen Key

- Push rear wheel forward to increase chain slack on rear sprocket.

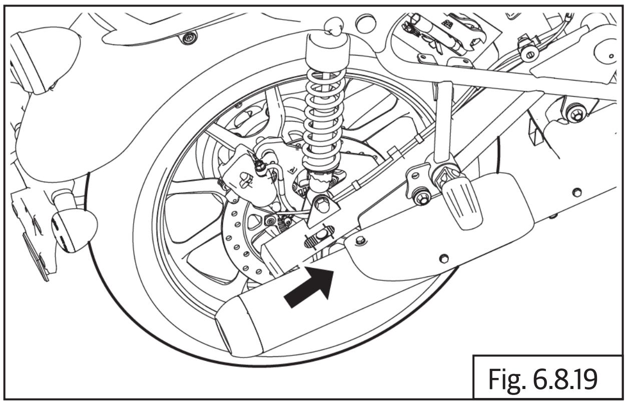


Fig. 6.8.19

- Remove chain adjuster assembly **(a)** from swing arm RH **(b)**.

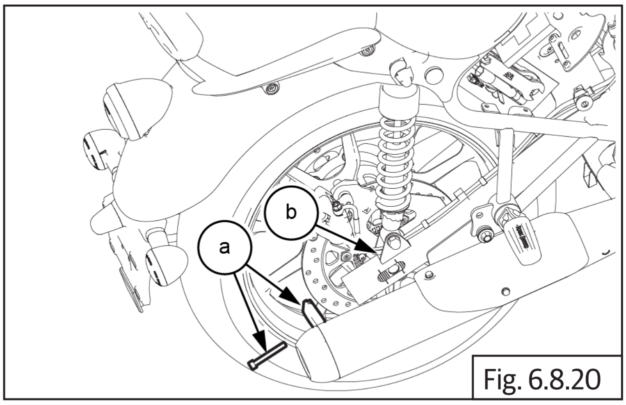


Fig. 6.8.20

- Remove spindle **(a)** from rear wheel LH along with washer **(b)**.

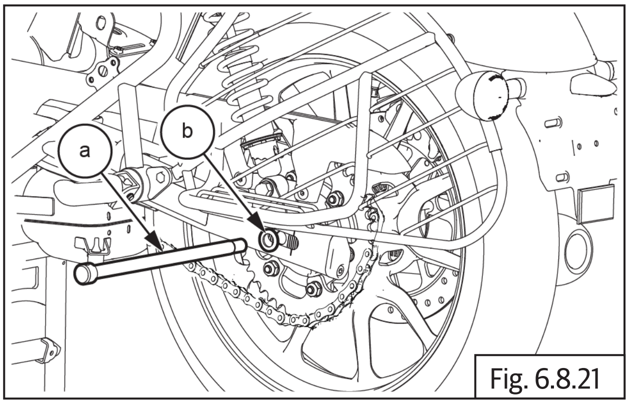


Fig. 6.8.21

🔧	Tommy bar

- Gently remove chain adjuster assembly **(a)** from swing arm LH **(b)**.

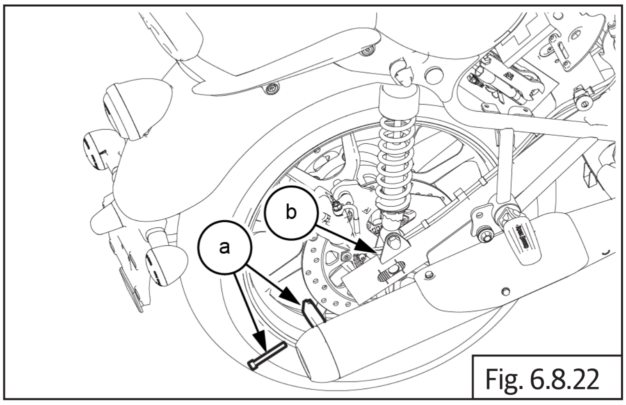


Fig. 6.8.22

- Slide out and remove brake caliper **(a)** with bracket.

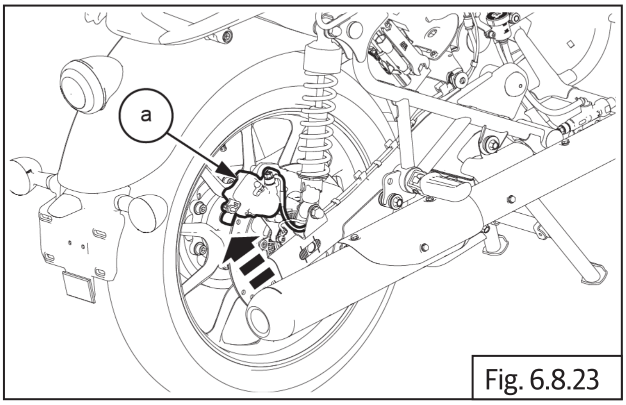


Fig. 6.8.23

⚠ CAUTION

Support the caliper carefully and ensure it does not get damaged.

- Gently release drive chain **(a)** from sprocket **(b)**.

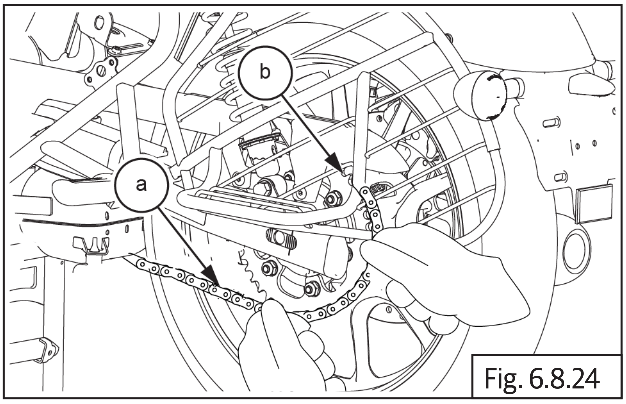


Fig. 6.8.24

- Gently remove spacer RH **(a)** from the rear wheel hub **(b)**.

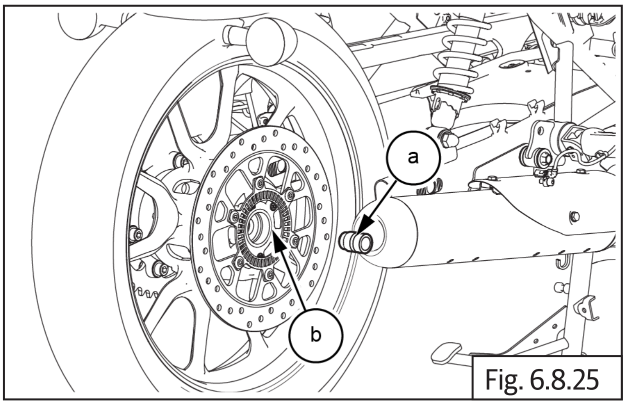


Fig. 6.8.25

- Gently remove rear wheel **(a)** from swing arm **(b)**.

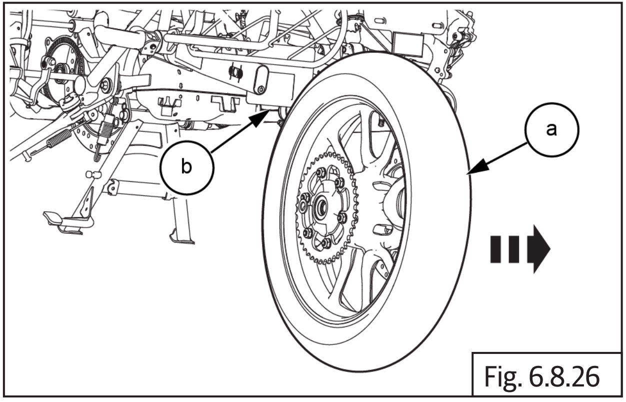


Fig. 6.8.26

6.8.4. Rear Wheel and Brake Disc

- Loosen and remove 6 Nos. Hex flanged socket head nuts **(M8) (a)** to remove chain sprocket **(b)**.

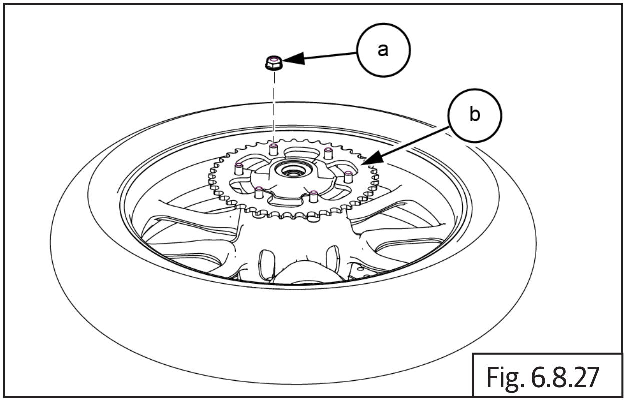


Fig. 6.8.27

⚒	6 mm Allen socket with Ratchet

- Remove chain driven sprocket **(a)** from sprocket carrier **(b)**.

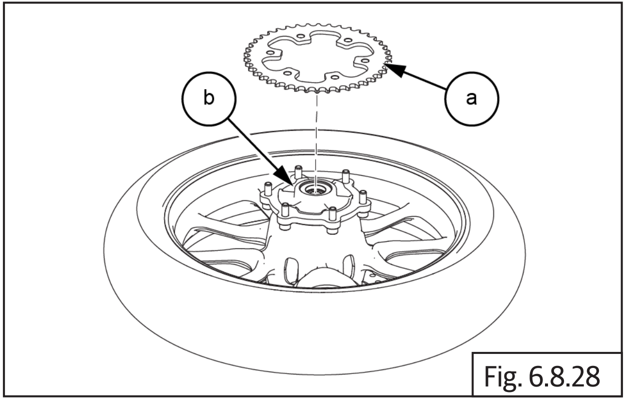


Fig. 6.8.28

- Remove sprocket carrier **(a)** from the rear wheel hub **(b)**.

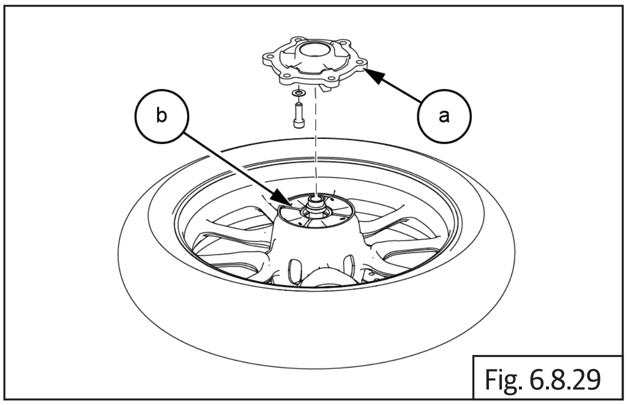


Fig. 6.8.29

- Remove 4 Nos. cush rubbers **(a)** from rear wheel hub LH **(b)**.

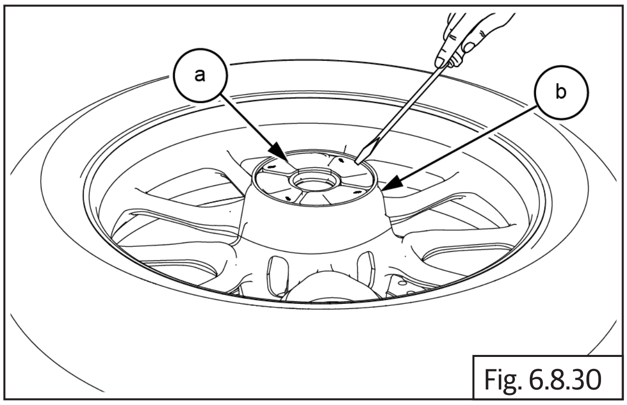


Fig. 6.8.30

⚒	Connector

- Loosen and remove 6 Nos. Hex head button socket screws **(M6) (a)** to remove ABS toner.

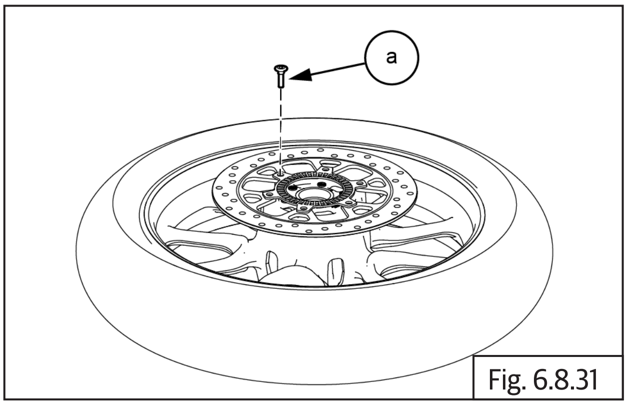


Fig. 6.8.31

⚒	5 mm Allen socket with Ratchet

- Remove ABS toner wheel **(a)** from rear wheel RH.

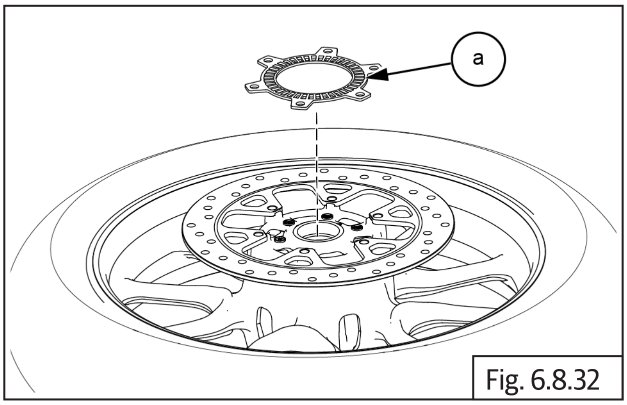


Fig. 6.8.32

- Remove rear brake disc **(a)** from the rear wheel hub RH **(b)**.

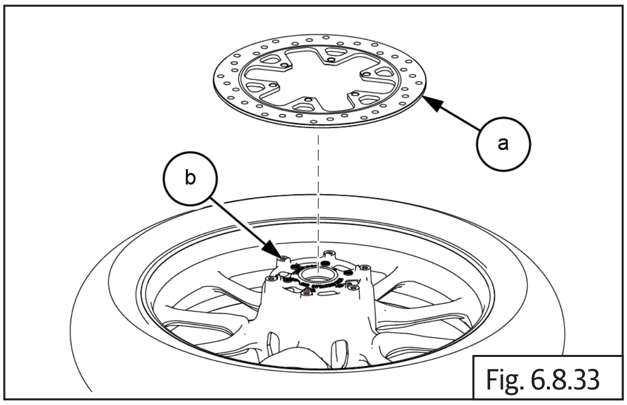


Fig. 6.8.33

- Remove grease seal **(a)**.

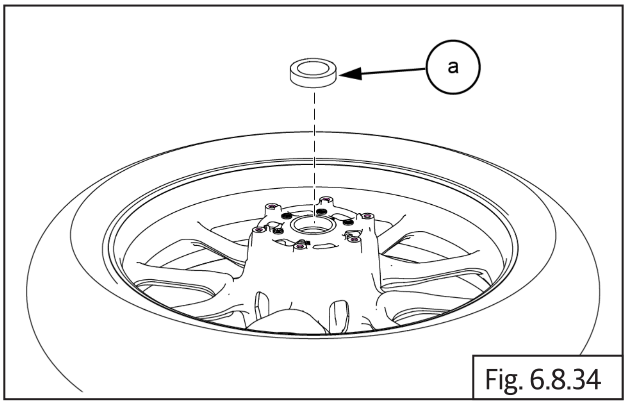


Fig. 6.8.34

Connector

- Insert a punch **(a)** into hub **(b)** from LH side and drive out bearing RH **(c)**.

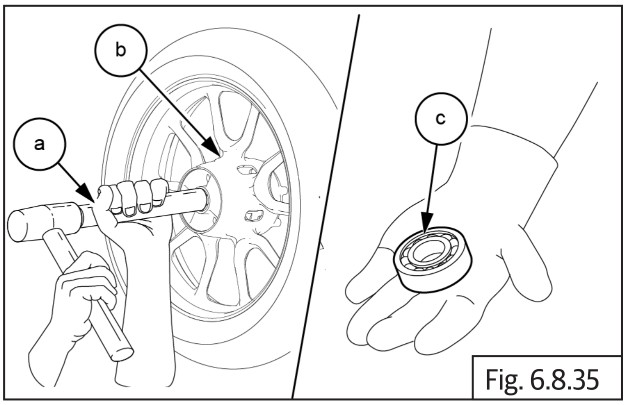


Fig. 6.8.35

Punch and Mallet

- Locate a suitable pointed punch **(a)** on spacer from RH of hub **(b)** to remove bearing LH **(c)**.

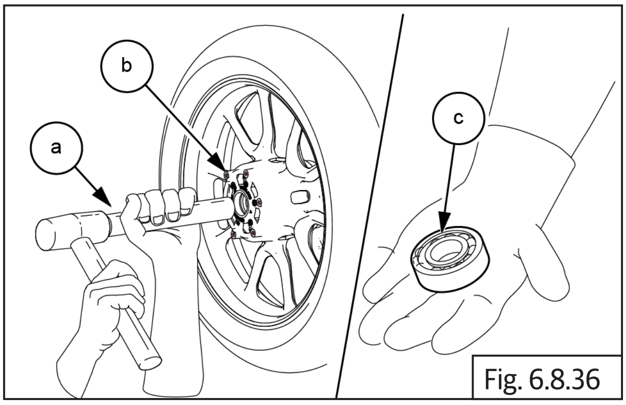


Fig. 6.8.36

Punch and Mallet

- Remove spacer **(a)** from the rear wheel hub RH.

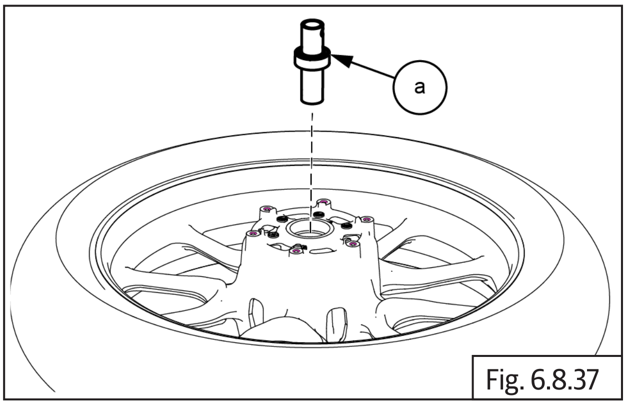


Fig. 6.8.37

- Gently tap to remove spacer **(a)** from sprocket carrier **(b)**.

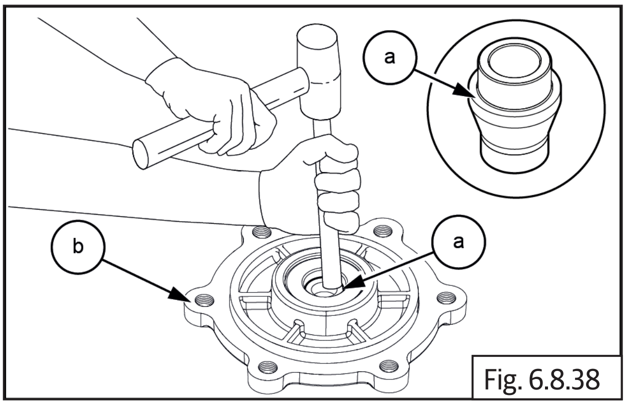


Fig. 6.8.38

🔧	Punch and Mallet

⚠ CAUTION

DO NOT apply excessive force to remove the bearing, spacer as it may cause damage.

- Gently remove grease seal **(a)** from the sprocket carrier **(b)**.

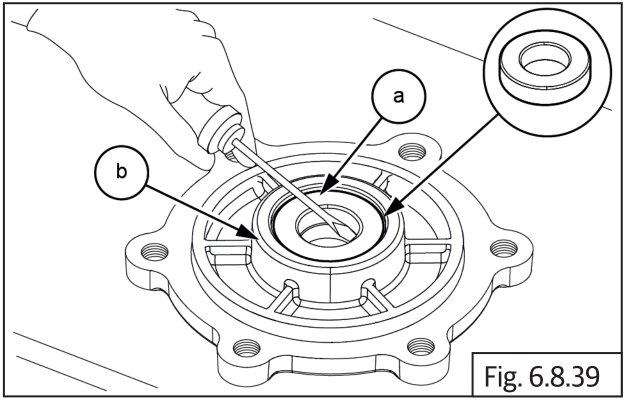
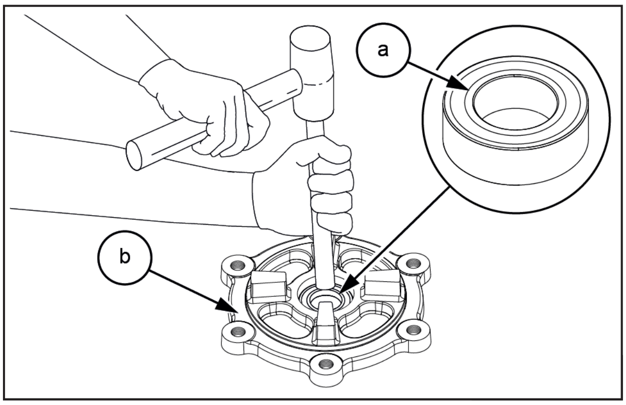


Fig. 6.8.39

🔧	Connector

- Gently remove bearing **(a)** from the sprocket carrier **(b)**.



Inspection

6.8.5. Front Wheel and Brake Disc

- Inspect tyre condition and wheel rim for any damages or bends and replace if out of specifications.

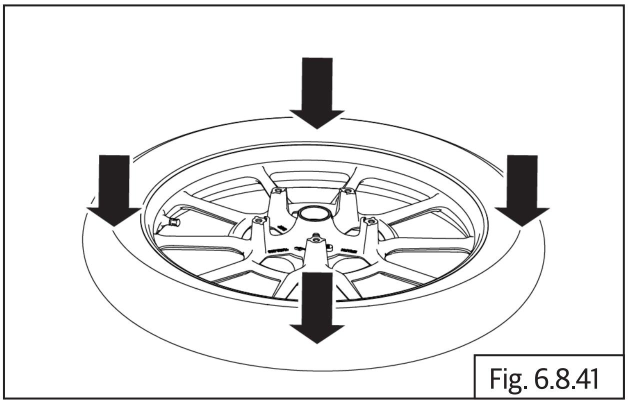


Fig. 6.8.41

- Inspect and replace spindle **(a)** if it has excess wear, rust or bends.

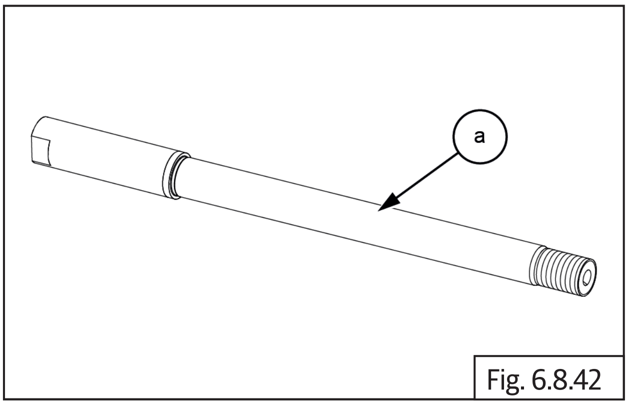


Fig. 6.8.42

- Check tyres for any uneven wear out and the sipes on the center of the tyre is above the TWI index.

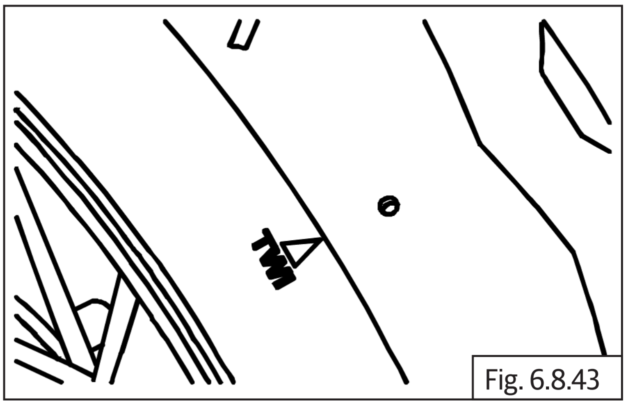


Fig. 6.8.43

🔧	Tyre depth gauge

- Check noise and play on bearing LH and RH.

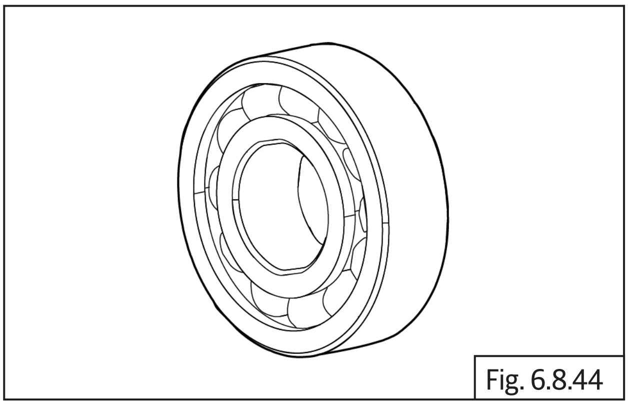


Fig. 6.8.44

- Check and replace wheel spacer if it has excess wear-out.

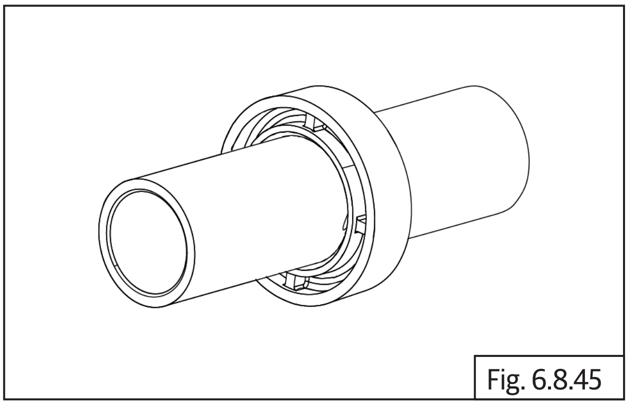


Fig. 6.8.45

- Check if wheel hub assembly is cracked or damaged and replace.
- Check and replace wheel hub bearing seated portion if there is any scoring.

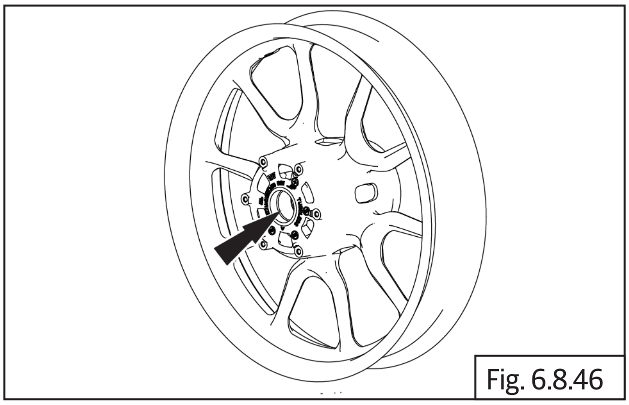


Fig. 6.8.46

- Inspect wheel rim run out / face out and replace if out of specifications.

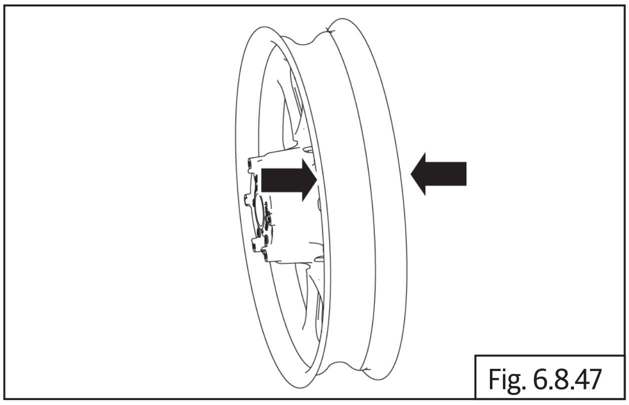


Fig. 6.8.47

Service limit:	1 mm

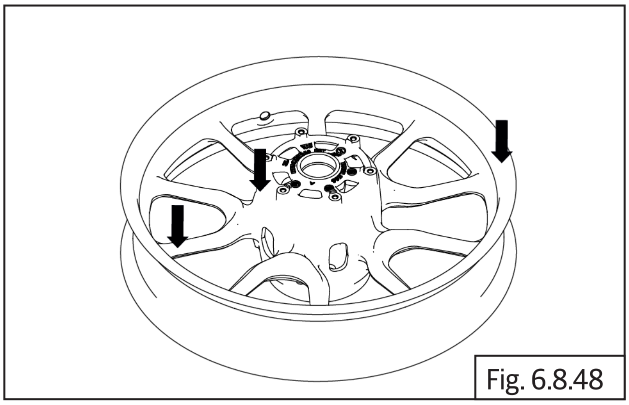


Fig. 6.8.48

- Inspect for rust, deep scoring, any foreign materials, burn marks crack in the mounting location of brake disc.
- Inspect brake disc thickness and run-out. Measure depth at points where scoring is found on the discs and replace if there is excess wear.
- Also measure thickness at the points indicated in the illustration and replace disc if out of specifications.

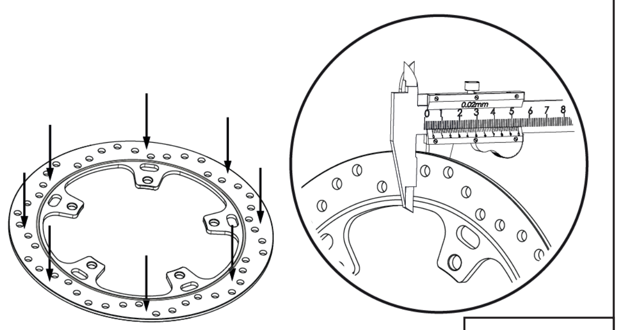


Fig. 6.8.49

Vernier caliper

Service limit:	4.0 mm

- Place brake disc rotor on a flat surface and inspect warpage. Replace if it is out of specifications.

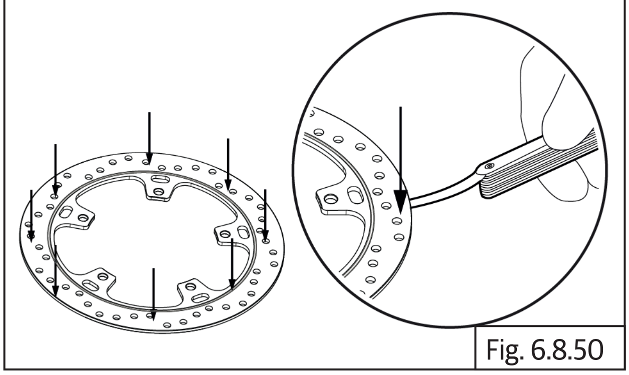


Fig. 6.8.50

Feeler gauge

Standard:	0.00mm
Service limit:	0.10mm

- Inspect and replace toner wheel plate if there are any damages or bends.

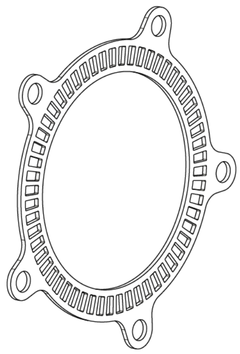


Fig. 6.8.51

- After assembly of brake disc **(a)** into front wheel, insert spindle into rim, fix on wheel balance frame **(c)** and rotate rim to check the disc run-out with dial gauge **(b)**. Ensure run-out is within specified service limits.

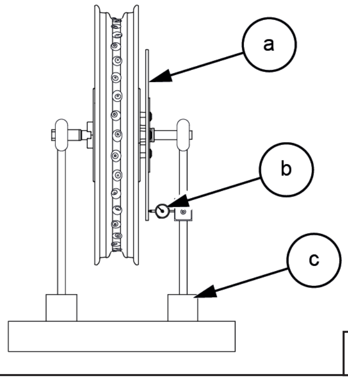


Fig. 6.8.52

Service limit:	0.10 mm

NOTE

- *Run-out of brake disc should be checked only when brake disc is assembled on wheel hub.*

6.8.6. Rear Wheel and Brake Disc

- Inspect tyre condition and wheel rim for any damages or bends and replace if doesn't meet the specifications.

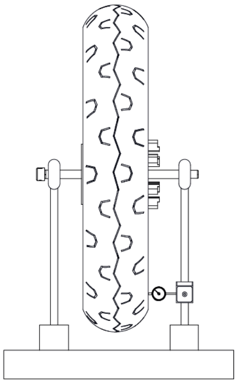


Fig. 6.8.53

- Inspect and replace spindle **(a)** if it has excess wear, rust or bends.

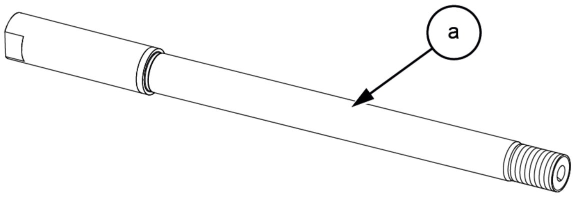


Fig. 6.8.54

- Check noise and play on bearing LH and RH. Replace if necessary.

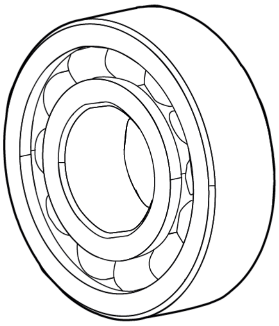


Fig. 6.8.55

- Check and replace spacer if it has excess wear-out.

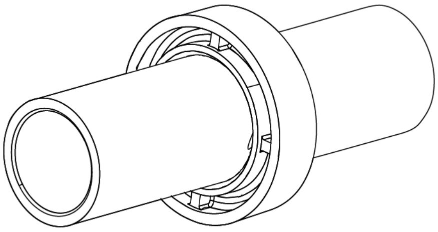


Fig. 6.8.56

- Inspect ABS toner wheel **(a)** for any bends or damages.
- Place ABS toner wheel on a flat surface and check warpage. Replace if out of specifications.

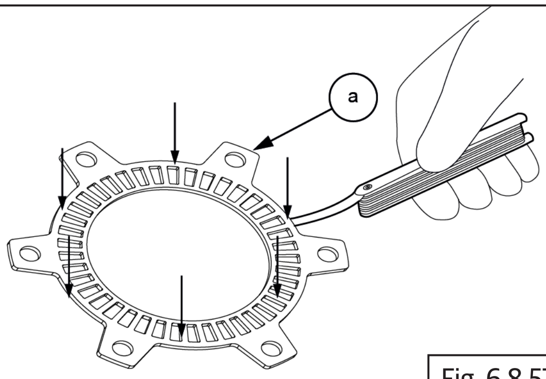


Fig. 6.8.57

🔧	Feeler gauge

Standard:	0.00 mm
Service limit:	0.10 mm

- Inspect for rust, deep scoring, any foreign materials, burn marks crack in the mounting location of brake disc.
- Inspect brake disc thickness and run-out. Measure depth at points where scoring is found on the discs and replace if there is excess wear.
- Also measure thickness at the points indicated in the illustration and replace disc if out of specifications.

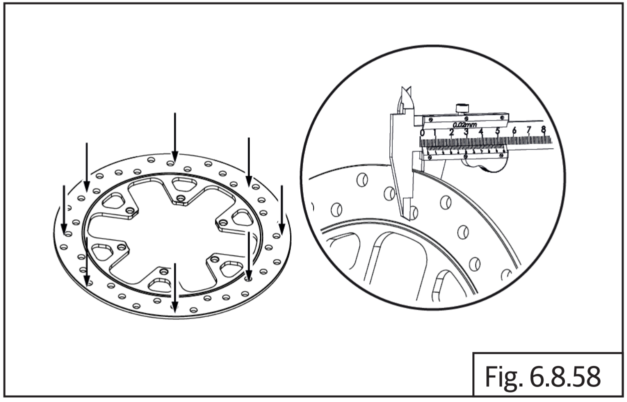


Fig. 6.8.58

	Vernier caliper

Service limit:	0.8 mm

- Place brake disc rear on a flat surface and check warpage. Replace if out of specifications.

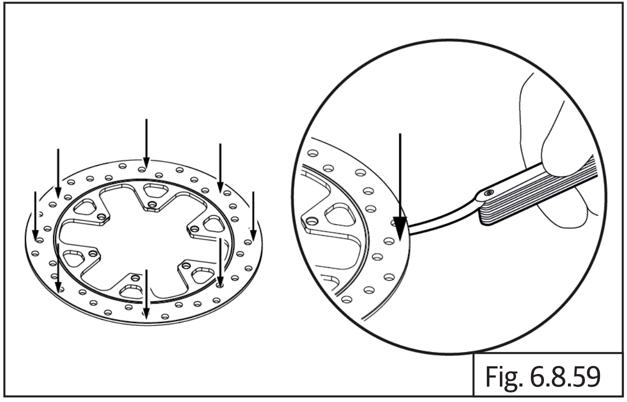


Fig. 6.8.59

	Feeler gauge

Standard:	0.00 mm
Service limit:	0.10 mm

- Inspect wheel hub assembly for any cracks or damages. Replace if out of specifications.
- Inspect if hub bearing seating portion has scoring. Replace if out of specifications.

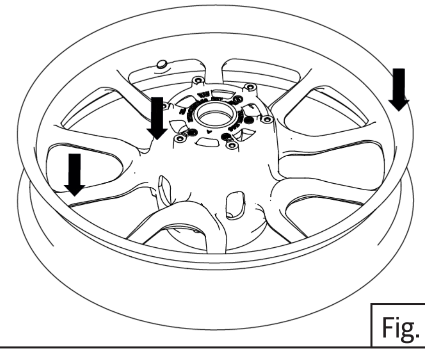


Fig. 6.8.60

- After assembly of brake disc **(a)** into front wheel, insert spindle into rim, fix on wheel balance frame **(b)** and rotate rim to check the disc run-out with dial gauge **(c)**. Ensure run-out is within specified limits.

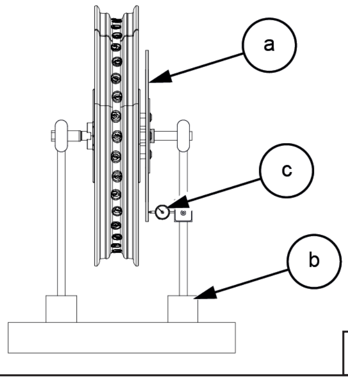


Fig. 6.8.61

⚠ CAUTION

Run-out of brake disc should be checked only when brake disc is assembled on wheel hub.

- Check rear wheel hub cushion rubbers **(a)** for any wear-out or damages.

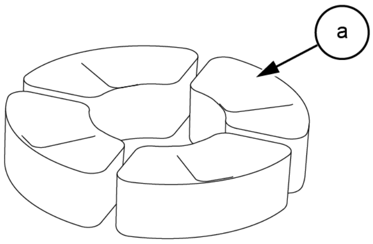


Fig. 6.8.62

- Check tyres for any uneven wear out and the sipes on the center of the tyre is above the TWI index.

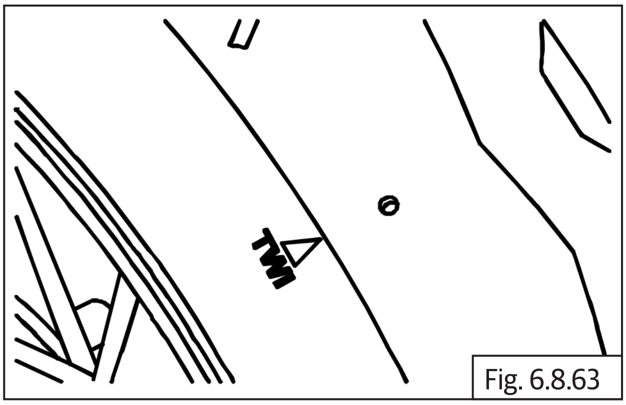


Fig. 6.8.63

🔧	Tyre depth gauge

Assembly

6.8.7. Tyre Assembly On Wheel Rim

- Ensure the tyre is assembled on the wheel rim with the arrow on the tyre side wall is facing towards the front.
- Inflate tyre to the recommended pressure and ensure the tyre is evenly seated in the rim on both LH and RH sides.

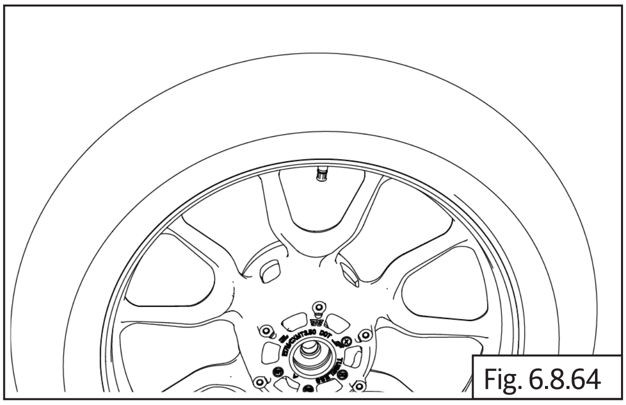


Fig. 6.8.64

6.8.8. Rear Wheel and Brake Disc

- Locate bearing LH **(a)** into rear wheel hub LH **(b)**. Gently tap on the bearing and ensure it is seated properly on the hub.

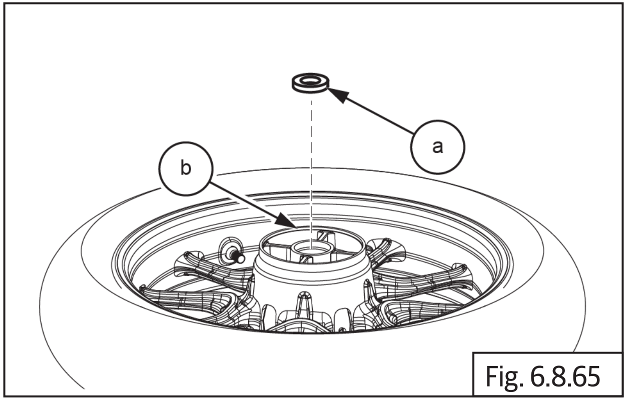


Fig. 6.8.65

🔧	Mallet

- Assemble spacer **(a)** into rear wheel hub RH. Ensure it is properly seated on the bearing surface.

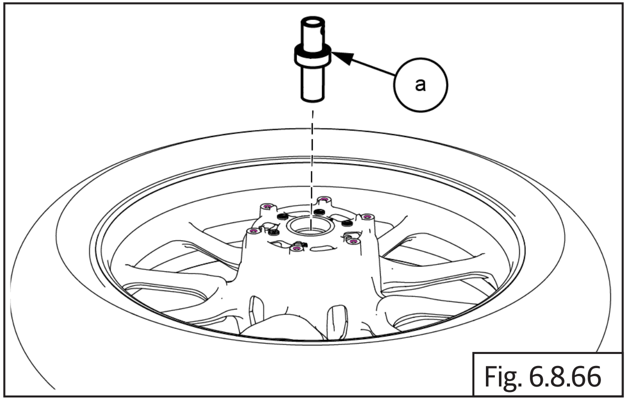


Fig. 6.8.66

- Locate bearing **(c)** into rear wheel hub RH **(b)**. Gently tap **(a)** on the bearing and ensure it is seated properly on the hub.

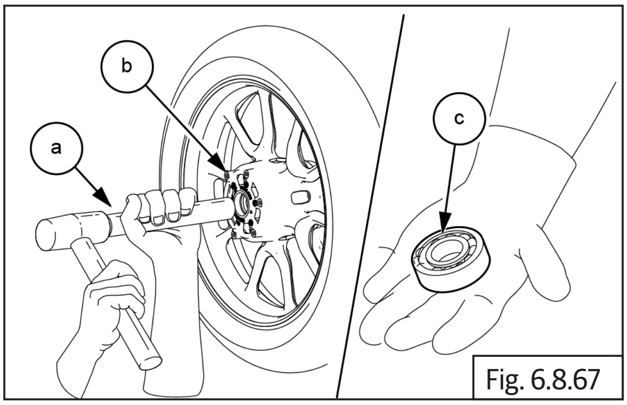


Fig. 6.8.67

- Assemble rear brake disc **(a)** into rear wheel hub RH **(b)**.

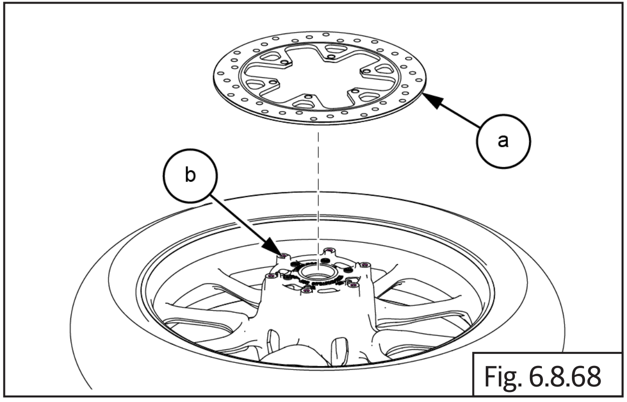


Fig. 6.8.68

- Assemble ABS toner wheel **(a)** into rear brake disc on rear wheel RH.

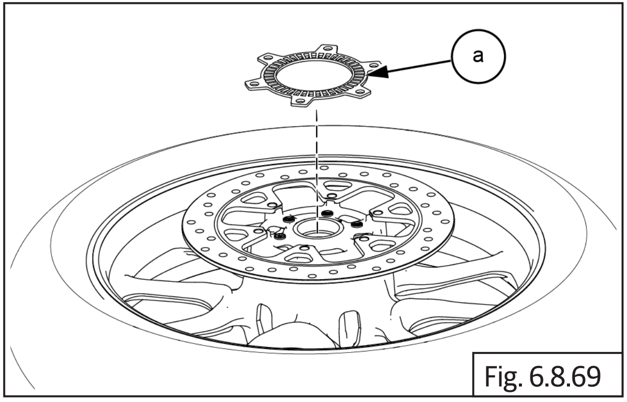


Fig. 6.8.69

⚠ CAUTION

Brake disc mounting bolts are pre coated. DO NOT reuse once thery are removed.

- Locate and tighten 6 Nos. Hex head button socket screws **(M6)** into rear wheel disc hub RH.

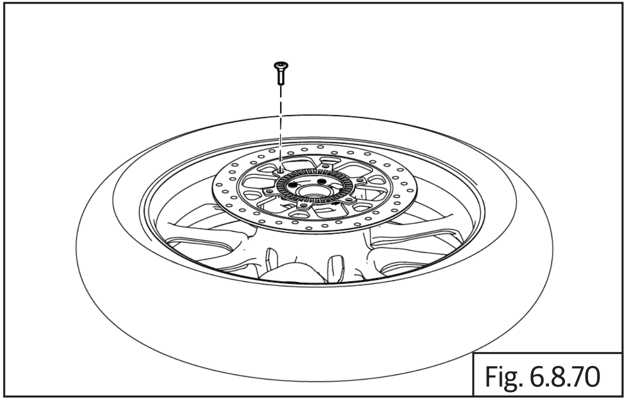


Fig. 6.8.70

🔧	5 mm Allen socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Clean cushion rubbers seating area and insert 4 Nos. cushion rubbers into rear wheel hub LH and gently tap with mallet .

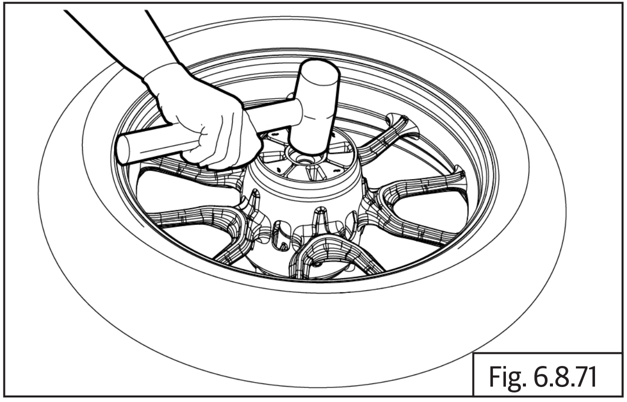


Fig. 6.8.71

🔧	Mallet

NOTE

- *Always use new cushion rubbers as they are for one time usage only.*

- Locate bearing **(a)** into sprocket carrier **(b)**. Ensure it is properly seated on the slot.

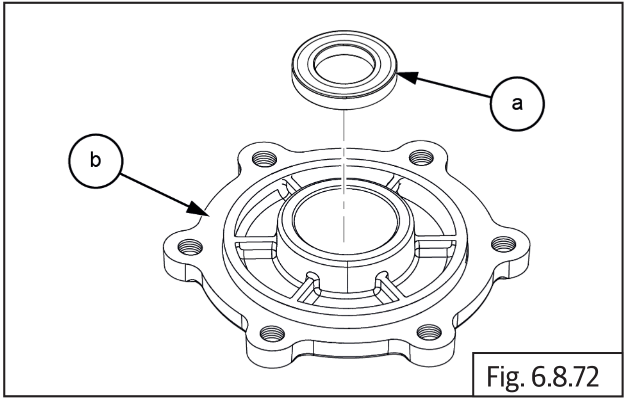


Fig. 6.8.72

- Assemble grease seal **(a)** into sprocket carrier **(b)**.

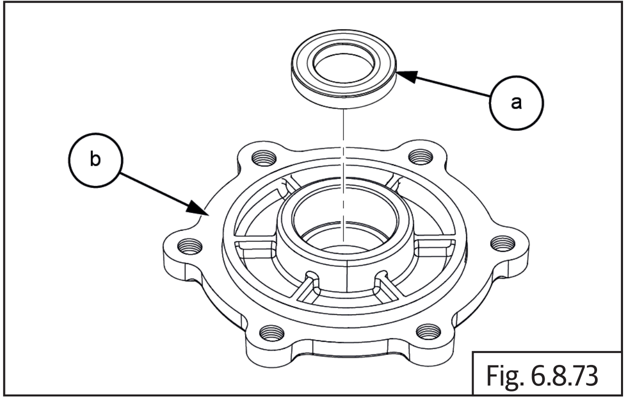


Fig. 6.8.73

- Locate and gently tap the spacer **(a)** into sprocket carrier **(b)**.

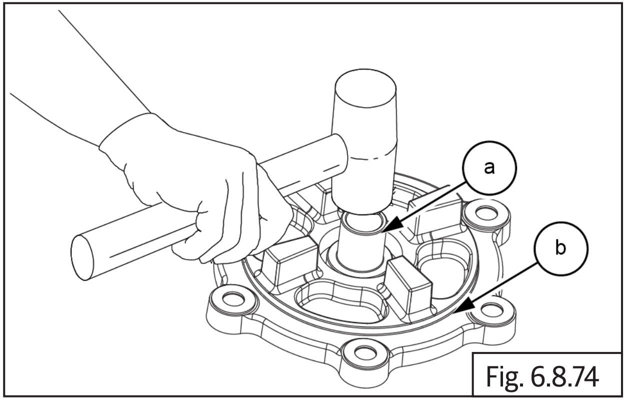


Fig. 6.8.74

🔧	Mallet

- Assemble rear sprocket carrier **(a)** over cushion rubbers into rear wheel hub LH **(b)**.

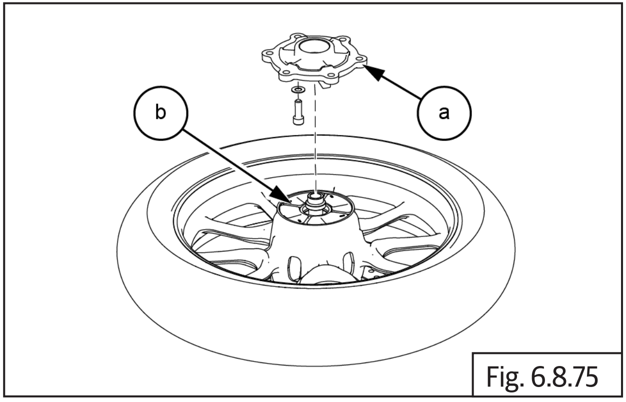


Fig. 6.8.75

- Locate chain drive sprocket **(a)** into sprocket carrier **(b)** on rear wheel hub LH.

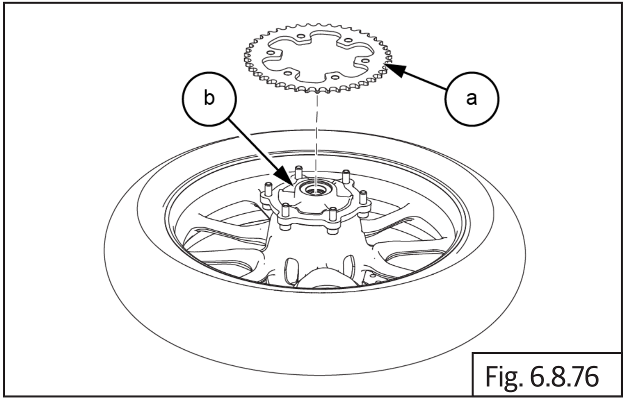


Fig. 6.8.76

- Locate and tighten 6 Nos. Hex flanged socket nuts **(M10)** **(a)** into carrier **(b)** on rear wheel LH.

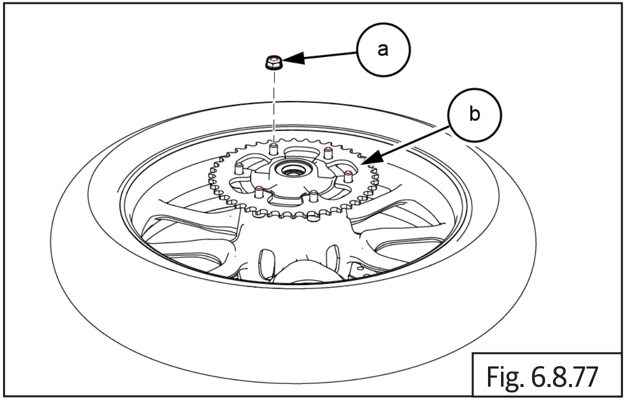


Fig. 6.8.77

🔧	12 mm socket with Ratchet
Torque	48-52 N-m/4.8-5.2 kgf-m

NOTE
• *Apply Loctite 243 on the threads of the bolt before installation.*

6.8.9. Rear Wheel into Swing Arm

- Gently locate rear wheel **(a)** into swing arm **(b)**.

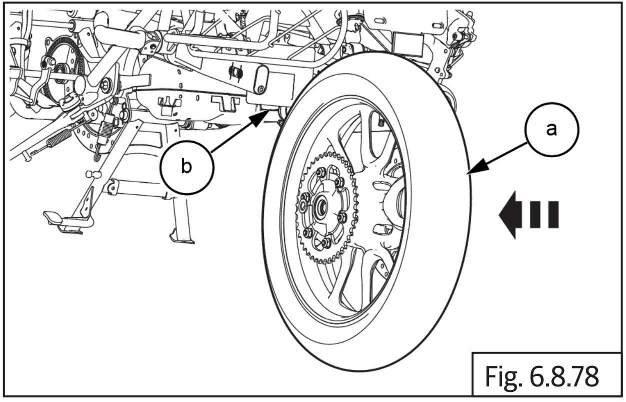


Fig. 6.8.78

- Insert spacer **(a)** into rear wheel hub RH **(b)**.

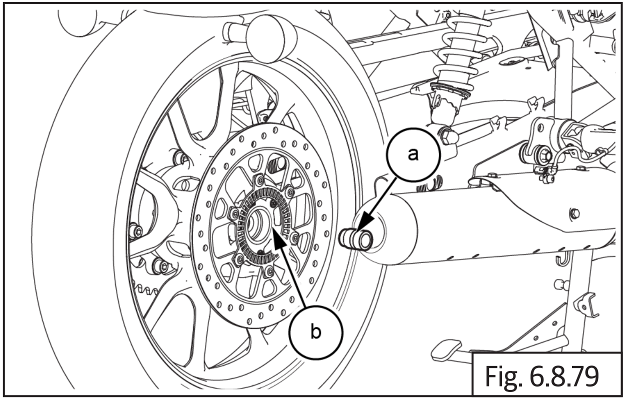


Fig. 6.8.79

- Locate drive chain **(a)** onto sprocket **(b)** and align wheel into swing arm.

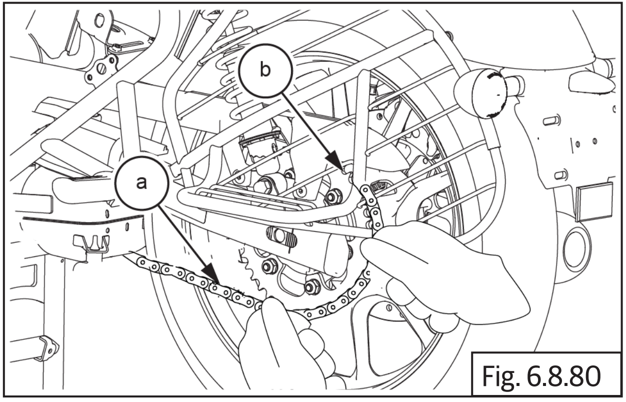


Fig. 6.8.80

- Slide the caliper assy **(a)** into the swingarm.

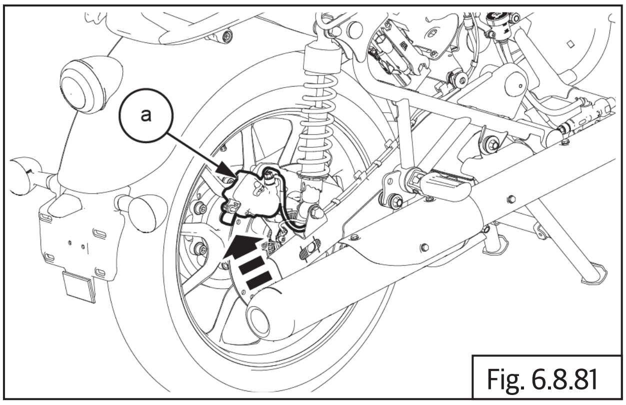


Fig. 6.8.81

- Assemble chain adjuster assembly **(a)** into swing arm LH **(b)**.

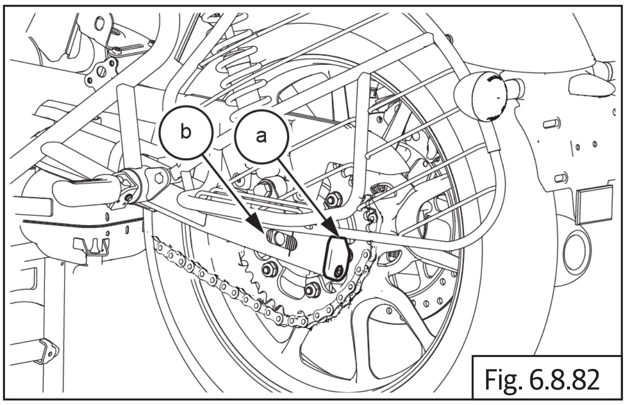


Fig. 6.8.82

- Insert spindle **(a)** with tommy bar into rear wheel hub LH along with washer **(b)**.

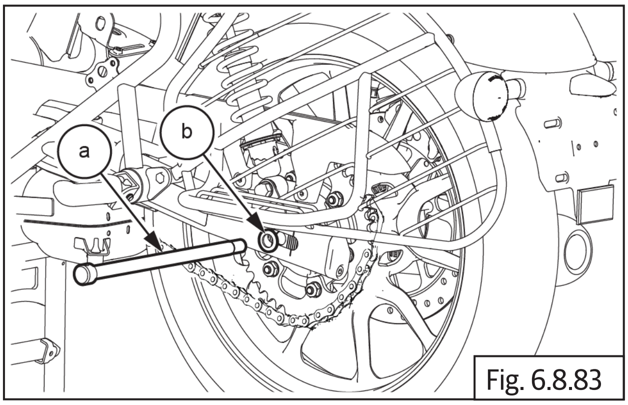


Fig. 6.8.83

🔧	Tommy bar

- Install washer **(a)** into spindle RH **(b)**.

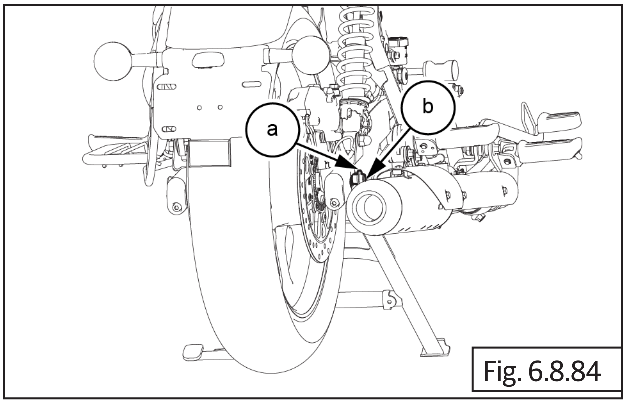


Fig. 6.8.84

- Assemble Hex nut **(M16) (a)** and tighten into swing .

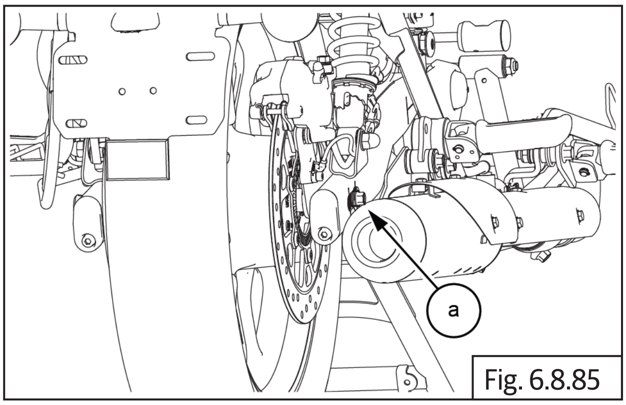


Fig. 6.8.85

🔧	24 mm Socket with Ratchet
Torque	63-77 N-m/6.3-7.7 kgf-m

6.8.10. Drive Chain Free Play Adjustment

- Inspect chain free play at 3 locations using a ruler. Free play for drive chain should be between 20 mm to 30 mm.

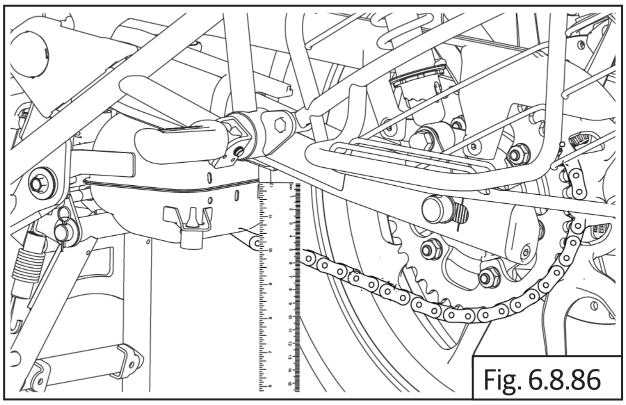


Fig. 6.8.86

- If the free play of the drive chain is not between 20 mm to 30 mm then hold spindle **(a)** on LH using a tommy bar and loosen **(M16) (b)** axle nut on RH.

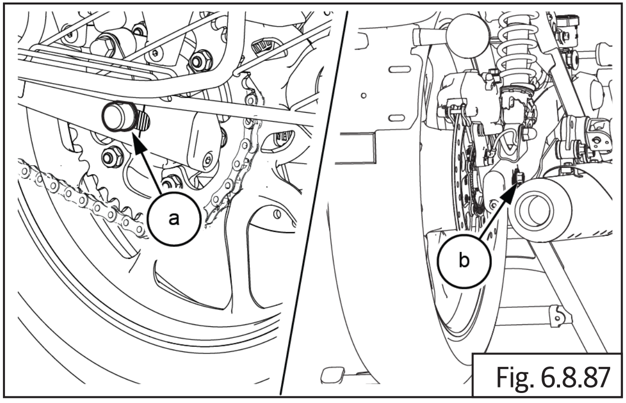


Fig. 6.8.87

🔧	24 mm Ring spanner

- To reduce free play loosen ajuster bolt **(M8) (a)** in anti clockwise and check distance in swing arm **(b)**.

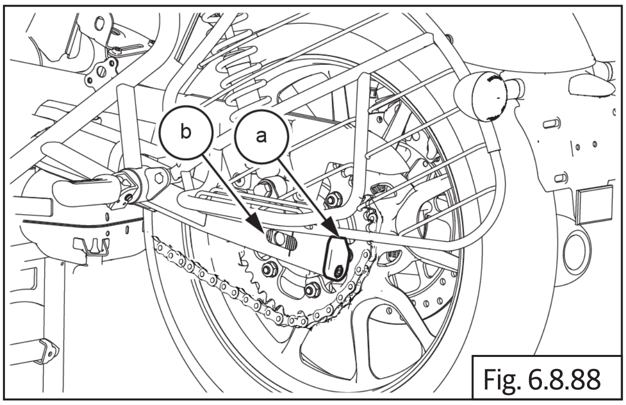


Fig. 6.8.88

🔧	6 mm Allen Key and Tommy bar

- Ensure the lines **(a)** are matched with the lines punched in swing arm on both LH & RH side for proper wheel alignment.

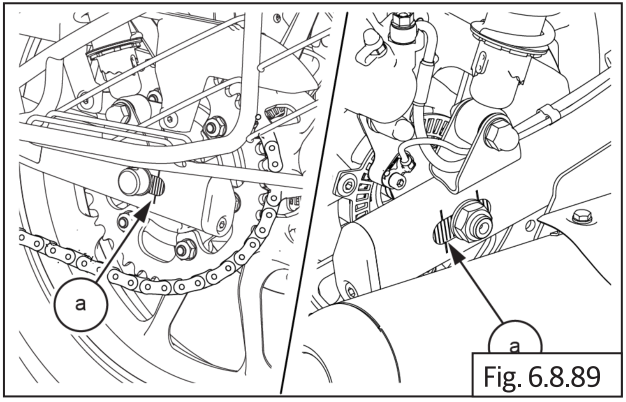


Fig. 6.8.89

- Now measure the drive chain free play using ruler and it should be between 20 mm to 30 mm.

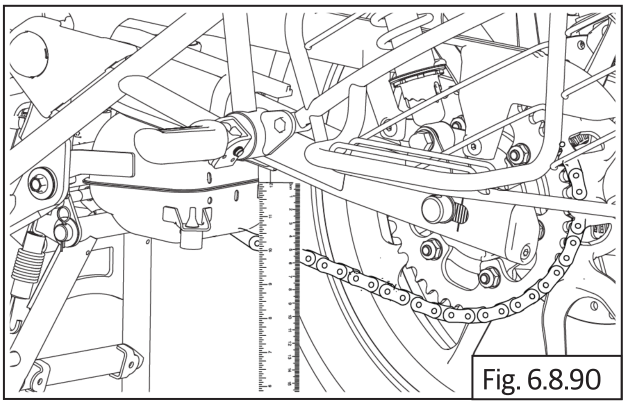


Fig. 6.8.90

⚠ CAUTION

Chain slackness beyond 30 mm will lead to chain slippage or breakage.

- Once chain free play is verified, hold spindle LH with tommy bar **(a)** and tighten the wheel axle nut **(M16) (b)**.

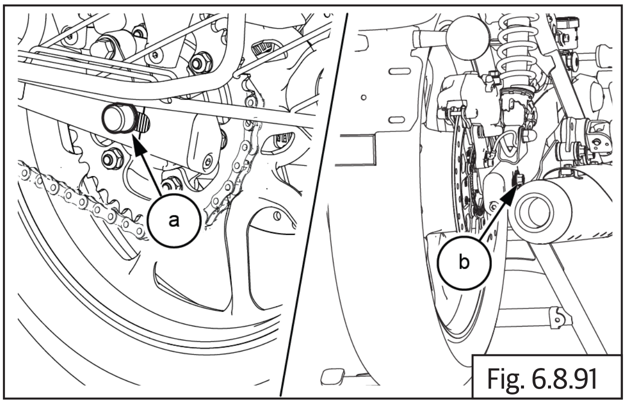


Fig. 6.8.91

🔧	24 mm Ring spanner and Tommy bar
Torque	63-77 N-m/6.3-7.7 kgf-m

6.8.11. Tyre Assembly on Wheel Rim

- Ensure the tyre is assembled on the wheel rim with the arrow on the tyre side wall is facing towards the front.
- Inflate tyre to the recommended pressure and ensure the tyre is evenly seated in the rim on both LH and RH sides.

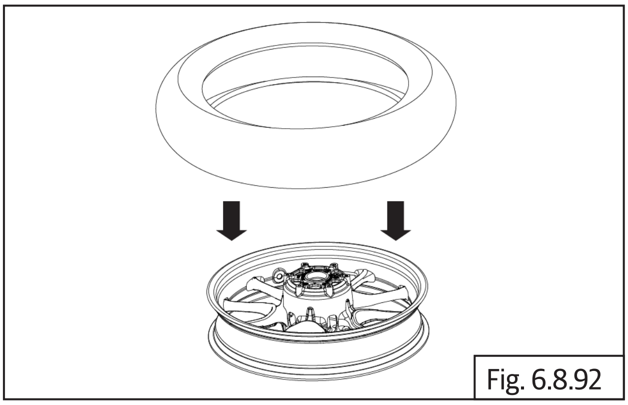


Fig. 6.8.92

6.8.12. Front Wheel and Front Brake Disc

- Locate front brake disc **(a)** on wheel hub with the disc facing up. Ensure mounting holes are correctly aligned.

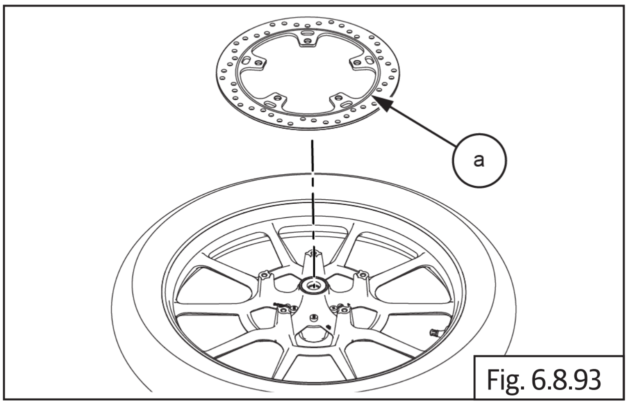


Fig. 6.8.93

- Position toner wheel **(a)** on front disc and ensure mounting holes are correctly aligned.

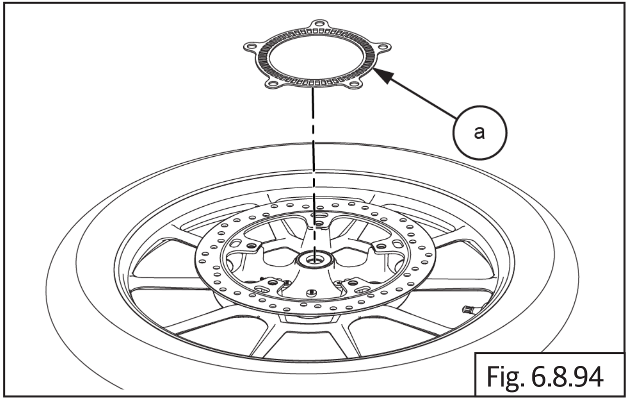


Fig. 6.8.94

⚠ CAUTION
Brake disc mounting bolts are pre coated. DO NOT reuse once thery are removed.

- Locate the bolts on the mounting holes and tighten toner ring and brake disc to the wheel hub in crisscross patten to specified torque.

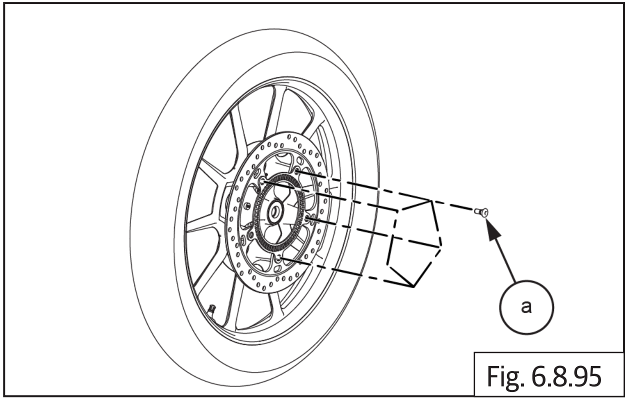


Fig. 6.8.95

🔧	5 mm Allen socket with Ratchet
Torque	21-29 N-m/2.1-2.9 kgf-m

- Insert bearing **(a)** into front wheel hub RH..

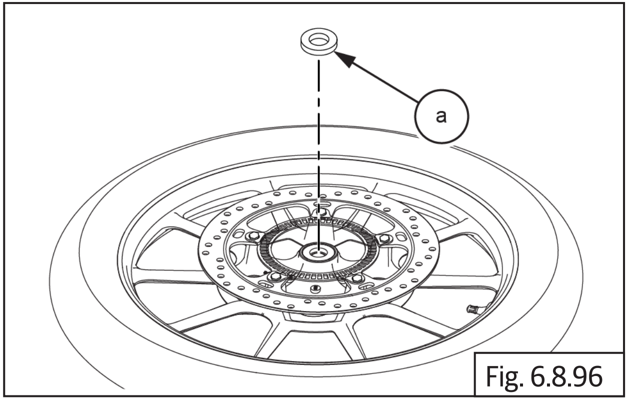


Fig. 6.8.96

- Insert bearing spacer **(a)** from LH side of front hub.

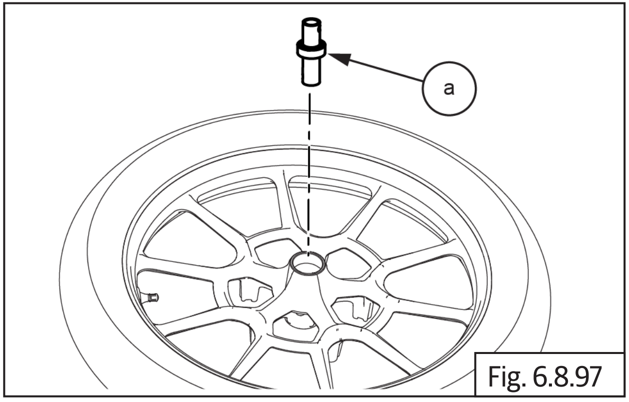


Fig. 6.8.97

- Insert bearing **(a)** into wheel hub LH.

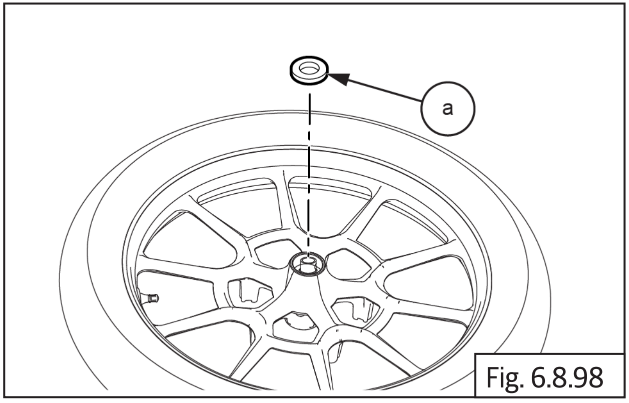


Fig. 6.8.98

- Install grease seal **(a)** into wheel hub LH with seal installer.

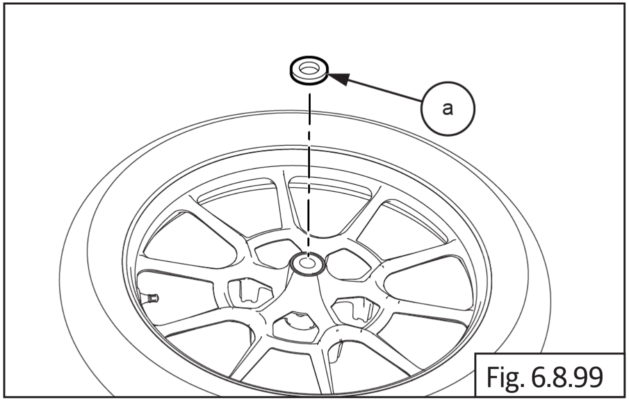


Fig. 6.8.99

🔧	Seal installer

6.8.13. Front Wheel into Front Fork Assembly

- Carefully align front wheel **(a)** into front fork assembly **(b)**.

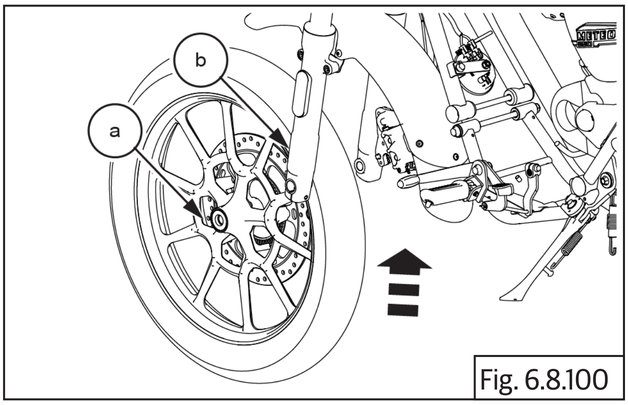


Fig. 6.8.100

- Insert spacer **(a)** in to wheel hub **(b)** from LH.

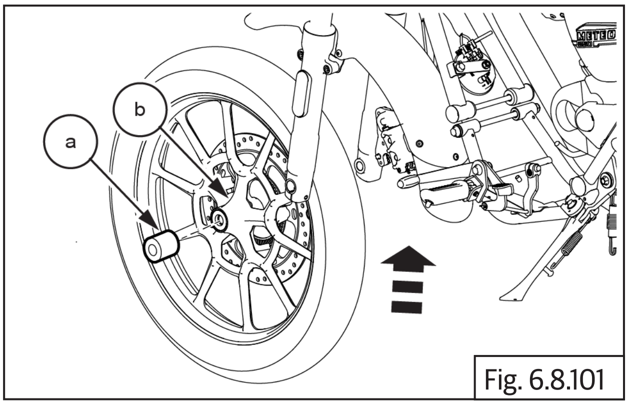


Fig. 6.8.101

- Insert spindle **(a)** into front fork assembly RH and wheel hub.

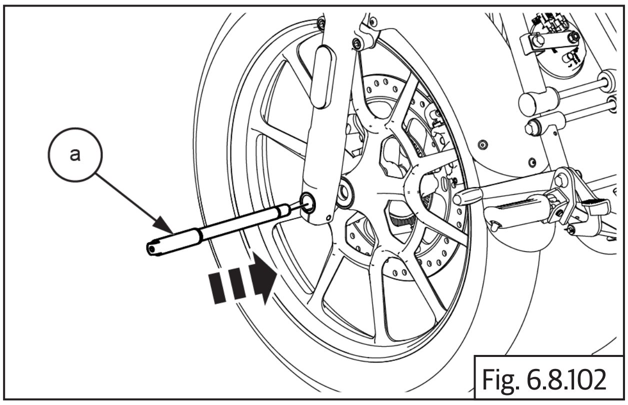


Fig. 6.8.102

- Insert Hex nut **(M16) (a)** along with washer into spindle bolt on LH.
- Hold spindle with spanner from RH and gently tighten Hex nut **(M16) (b)**.

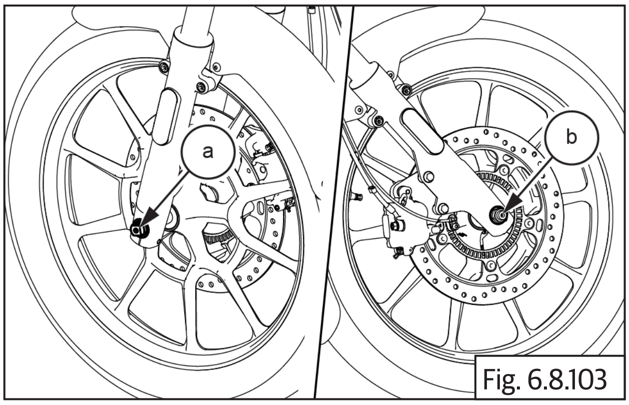


Fig. 6.8.103

🔧	24 mm Socket with Ratchet and 17 mm open end spanner
Torque	63-77 N-m/6.3-7.7 kgf-m

- Tighten Hex socket bolt **(M8) (a)** into front fork assembly RH.

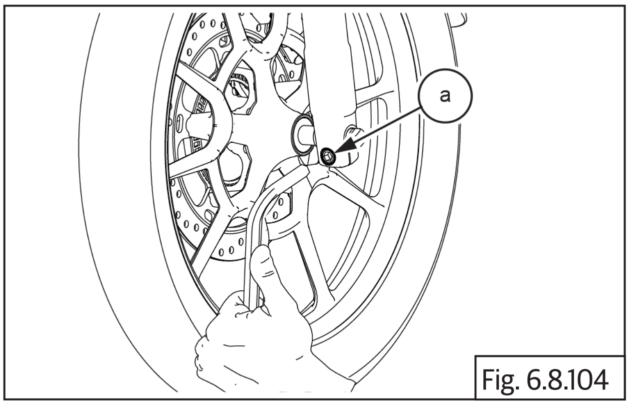


Fig. 6.8.104

🔧	6 mm Allen Key
Torque	21-29 N-m/2.1-2.9kgf-m

Troubleshooting

Symptom	Possible Cause	Diagnosis	How To Fix
1. Tyres Related			
Centre Threads Wear-Out Is High/ Poor Traction/ Unstable Riding	Tyre pressure is more than recommended.	Front and rear tyre pressure is over inflated.	Ensure correct tyre pressures.
Side Threads Wear-Out Is High/Side Wall Has Cracks/ Motorcycle Has Dragging/Unstable Riding	Tyre pressures is less than recommended.	Front and rear tyre pressures under inflated side walls have minute cracks.	Check inner tubes for any puncture/leaky valve pins ensure correct tyre pressures.
Rear Tyre Wear-Out On One Side	Improper wheel alignment.	Rear wheel misaligned with respect to front wheel.	Check and correct wheel alignment.
Tyre/S Wearing Out Is Uneven/ Motorcycle Is Unstable/Wobbling	Internal defect/poor quality tyre.	Tyres found to have bulges/ cracks in side wall. Threads are separated from the tyre.	Replace with Royal Enfield recommended tyres.
	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reset correctly.
	Wheel rims have a defect.	Wheel rims are bent/have excessive run out.	Remove tyre and carry out proper wheel truing.
	Rims have excessive side play.	Wheel bearings worn-out/ excessive play.	Remove and replace wheel bearings.

Symptom	Possible Cause	Diagnosis	How To Fix
2. Wheel Rims Related			
Motorcycle Is Unstable/Wobbling	Tyre seating on rims is improper	Tyre bead is uneven at the rim surface	Remove tyre and reset correctly
	Wheel rims are out of trueness	Wheel rims are bent/have excessive run out	Remove tyre and true the wheel rim correctly
	Wheel rims have a crack/heavy damage	Wheel rims are cracked/ damaged due to impact	Replace wheel rims
3. Others			
Motorcycle Is Unstable/Wobbling	Wheels have excessive axial/side play	Wheel bearings are worn-out	Remove bearing and replace
	Hubs Front/rear are cracked/ damaged	Wheel Hubs are damaged due to impact	Replace hubs

NOTE

- *The trouble shooting given in this section is only related to the issues with wheels. For complaints related to other issues such as poor suspension action/handling/unstable ride please refer to suspension (section 6.9).*

SUSPENSION

Suspension

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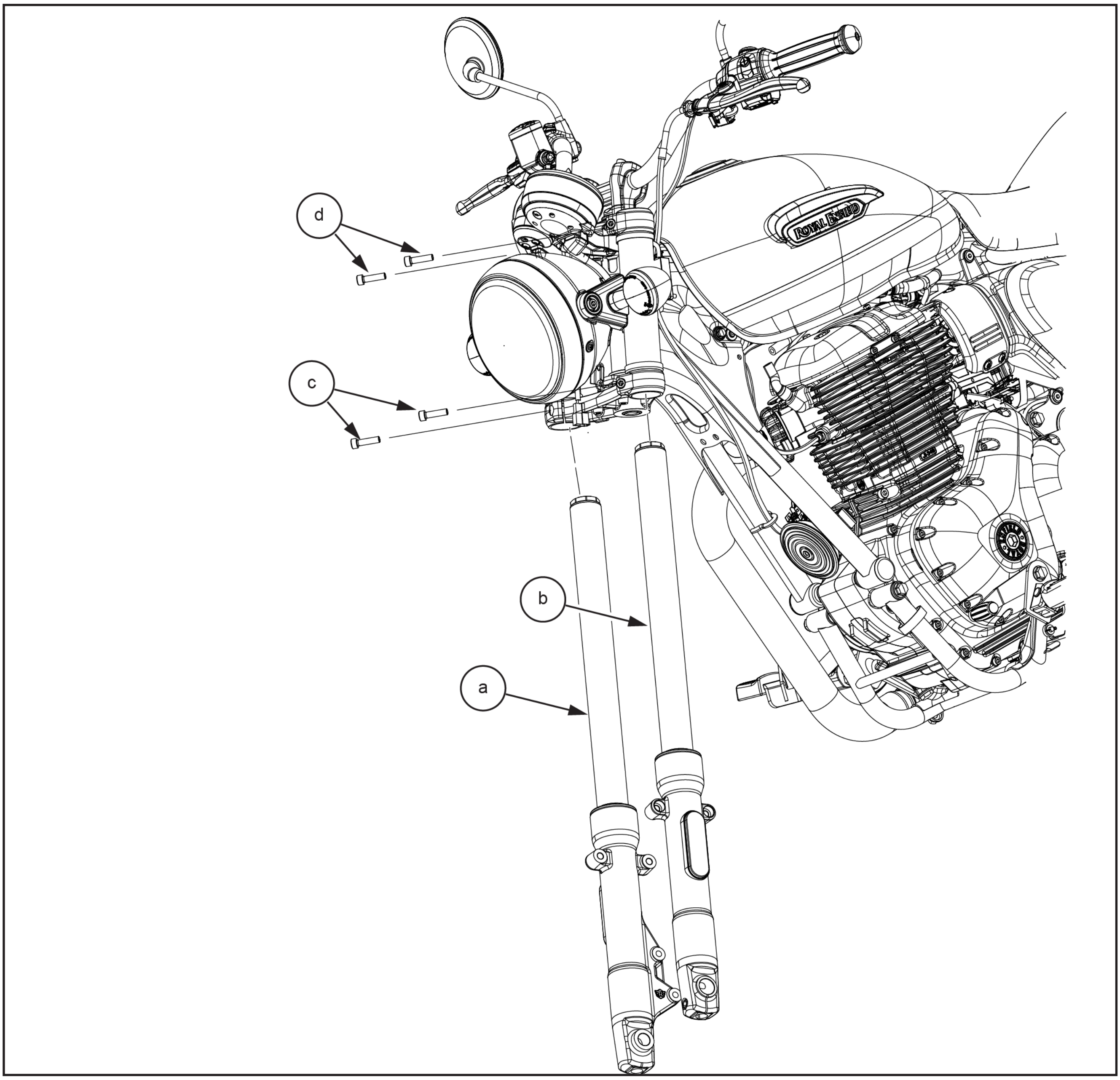
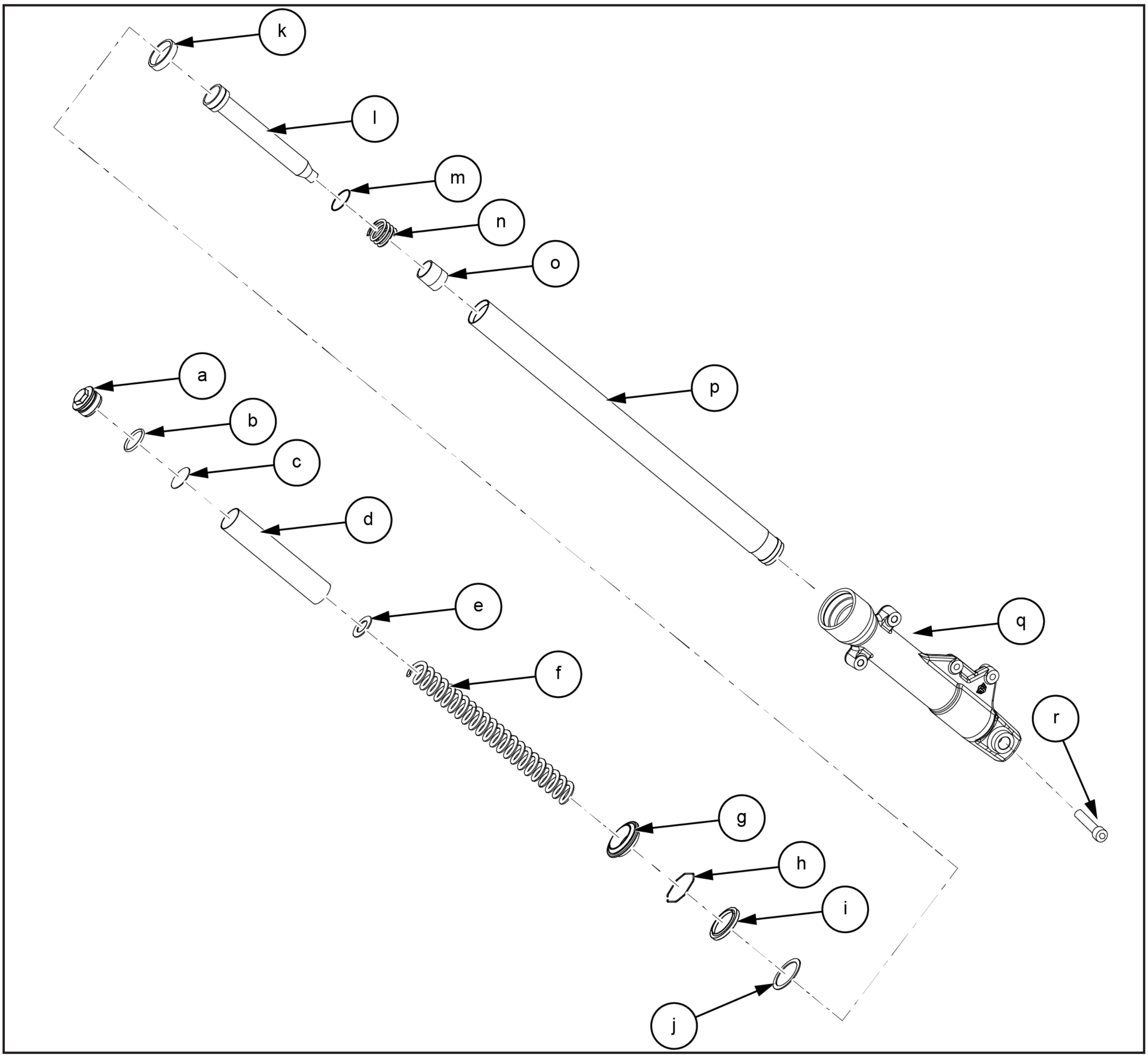
Front Fork Assembly Removal from Motorcycle



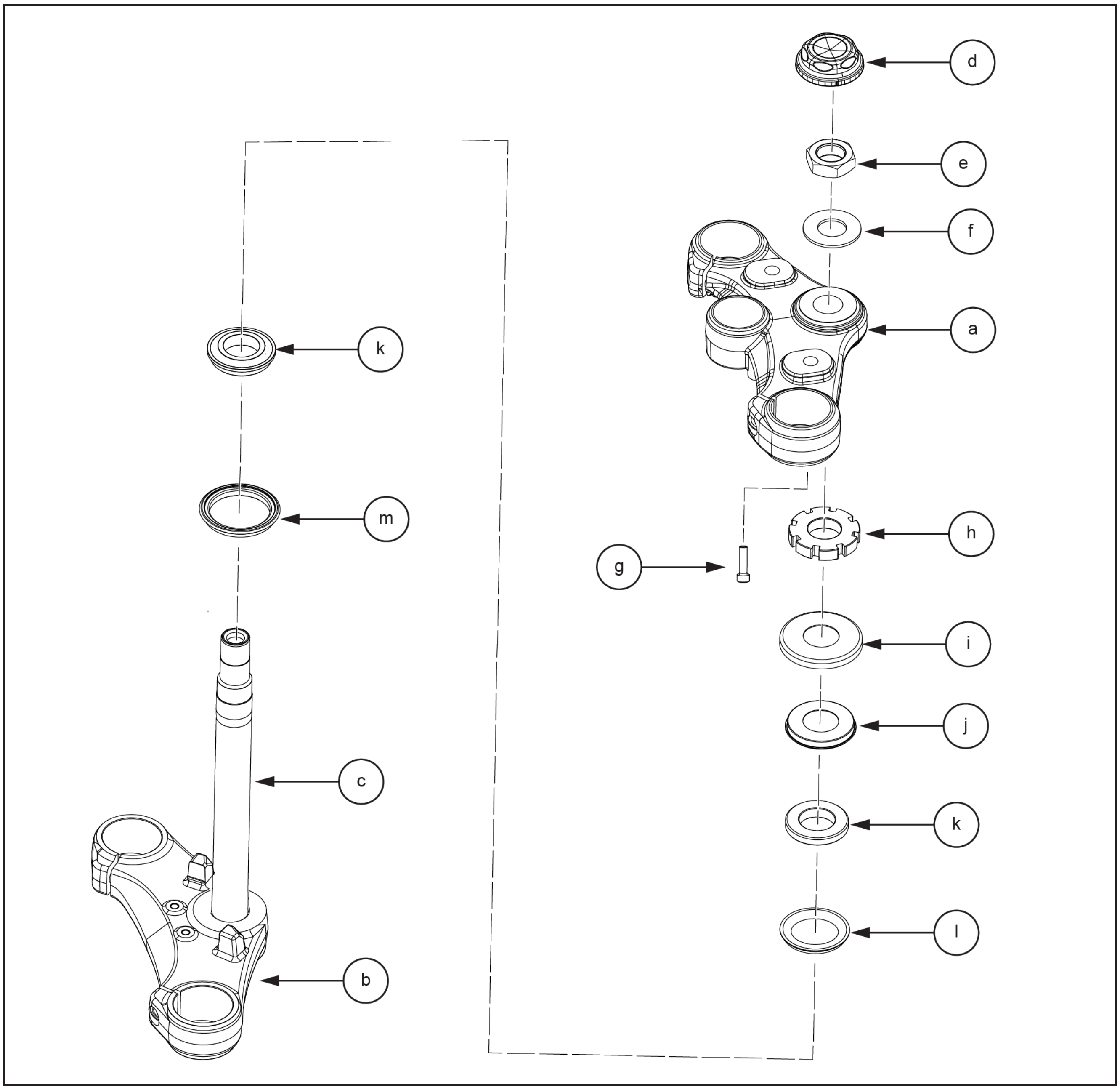
Item No.	Description	Quantity
a	Fork RH	1
b	Fork LH	1
c	Lower Clamp Hex Socket Head Cap pinch bolt, M8	2
d	Upper Clamp Hex Socket Head Cap pinch bolt, M8	2

Front Fork LH and RH



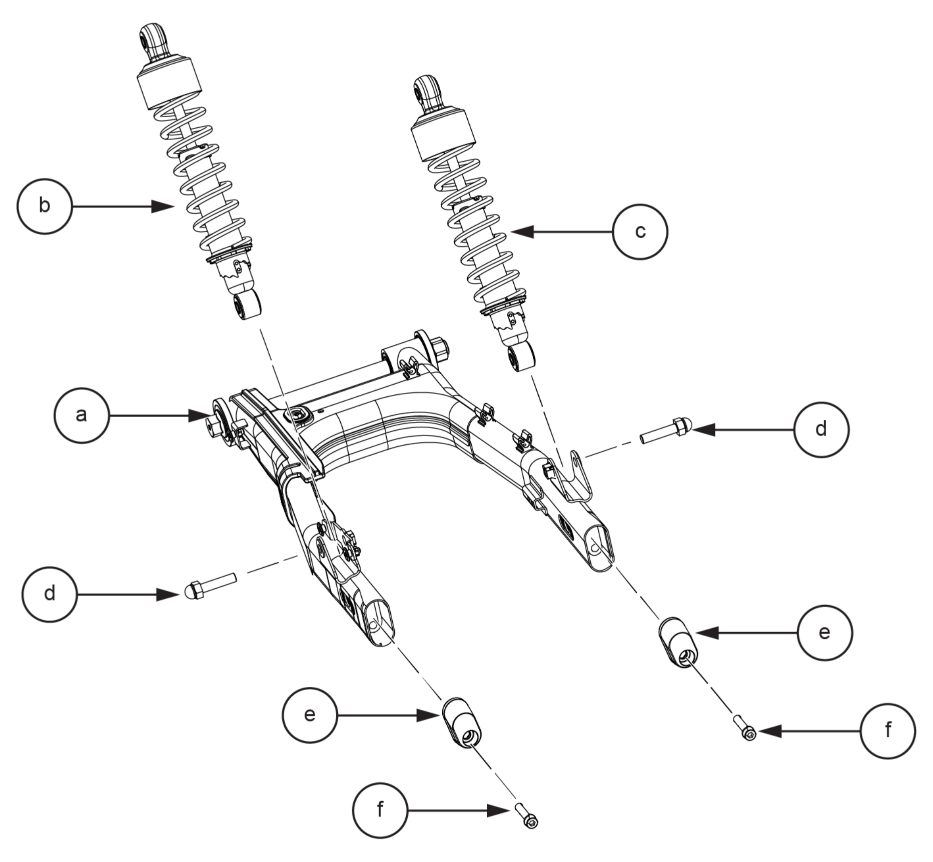
Item No.	Description	Quantity	Item No.	Description	Quantity
a	Front Fork Cap Nut	1	k	Bush	1
b	O-Ring	1	l	Piston Fork	1
c	Washer Plate	1	m	Piston Ring	1
d	Spacer Tube	1	n	Spring	1
e	Washer	1	o	Tapper Oil Lock	1
f	Fork Main Spring	1	p	Outer Tube	1
g	Dust Seal	1	q	Fork End	1
h	Seal Clip	1	r	Hex Socket Screw	1
i	Oil Seal	1			
j	Bush Washer	1			

Steering Stem



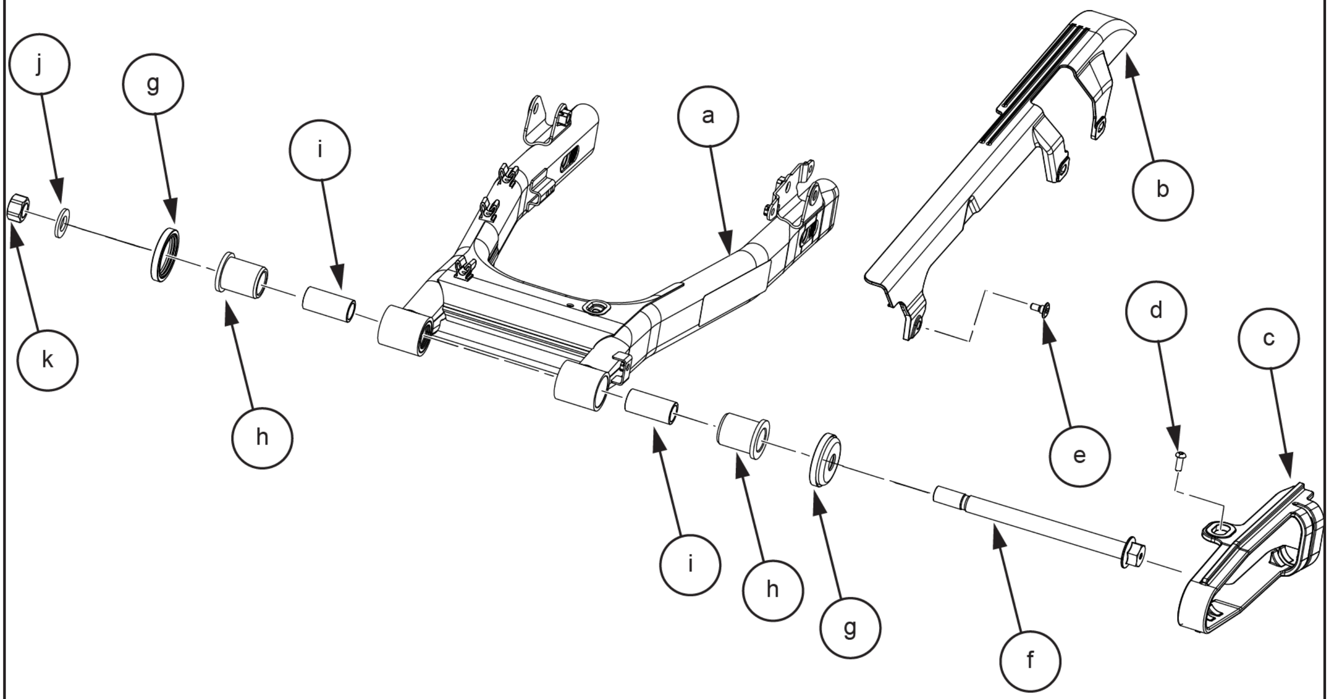
Item No.	Description	Quantity	Item No.	Description	Quantity
a	Top Yoke	1	h	Ring Nut	
b	Bottom Yoke	1	i	Seal Headstock Bearing	1
c	Steering Stem	1	j	Headstock Bearing Cup	1
d	Stem Nut Boot	1	k	Headstock Bearing	2
e	Stem Nut	1	l	Steering Stem	1
f	Washer	1	m	Steering Stem	1
g	Handlebar Lower Yoke Mounting bolt M8	2			

Shock absorber



Item No.	Description	Quantity
a	Swingarm	1
b	Shock absorber Rear LH	1
c	Shock absorber Rear RH	1
d	Button Head Bolt, M8	2
e	Chain Adjuster	2
f	Chain Adjuster Bolt, M10	2

Swingarm



Item No.	Description	Quantity
a	Swingarm	1
b	Chain Protector	1
c	Chain Rubber Strip	1
d	Chain Rubber Strip, Bolt M5	2
e	Chain Protector, Bolt M5	3
f	Spindle, Swingarm	1
g	Seal	2
h	Nylon Bush	2
i	Sleeve	2
j	Washer	1
k	Spindle Nut	1

6.9 Suspension

Dismantling

6.9.1. Front Fork LH and RH Removal from Motorcycle

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Locate a scissor jack **(a)** under cradle frame **(b)** and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm).

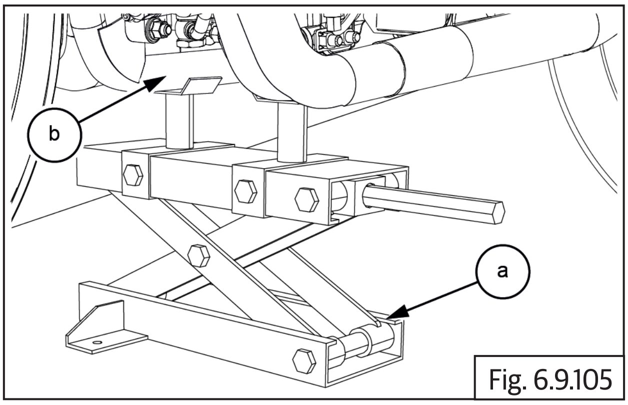


Fig. 6.9.105

- Ensure ignition and stop switch are in off position.
- Remove the following parts:
  - Front wheel (section 6.8.1).
  - Release brake hose and wheel speed sensor wires from the clips (section 9.3.2).
  - Wheel caliper from fork end LH (section 9.1.2). Support caliper suitably.
  - Wheel speed sensor from the fork end LH (section 9.3.2). Support wheel speed sensor suitably.
  - Front mudguard (section 6.6.2).
  - Front number plate (section 6.6.1).
  - Headlamp assembly and housing (section 11.1).
  - Trafficators front (section 11.1.6).
- Loosen fork cap bolts **(a)** just sufficiently on both LH and RH fork assemblies.

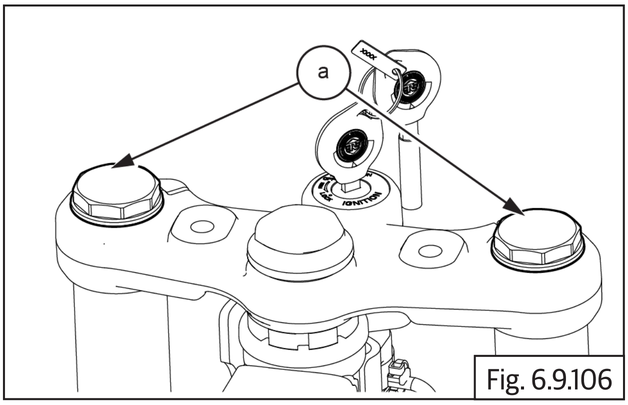


Fig. 6.9.106

36 mm Ring spanner

- Loosen 2 Nos. Hex socket head bolts **(M8) (a)** sufficiently on LH and RH steering stem.

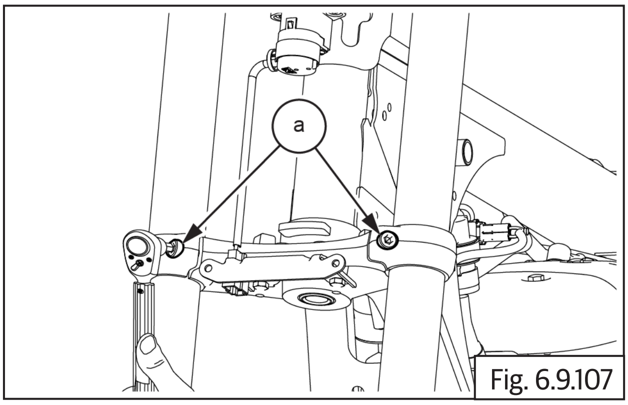


Fig. 6.9.107

6 mm Allen socket with Ratchet

- Loosen 2 Nos. Hex socket head bolts **(M8) (a)** sufficiently on LH and RH on yoke.

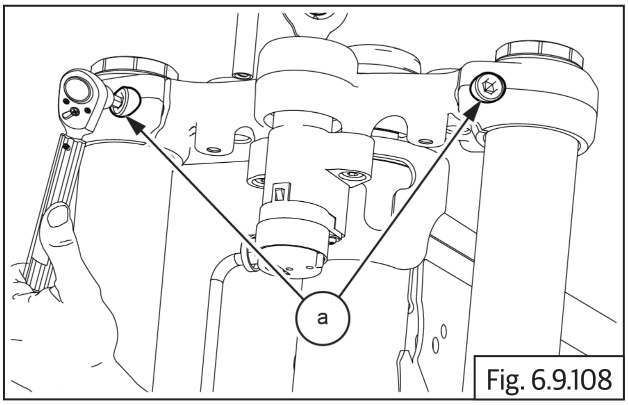


Fig. 6.9.108

6 mm Allen socket with Ratchet

- Gently rotate and pull out fork assembly LH **(a)** downwards to remove from top yoke and steering stem **(b)**.

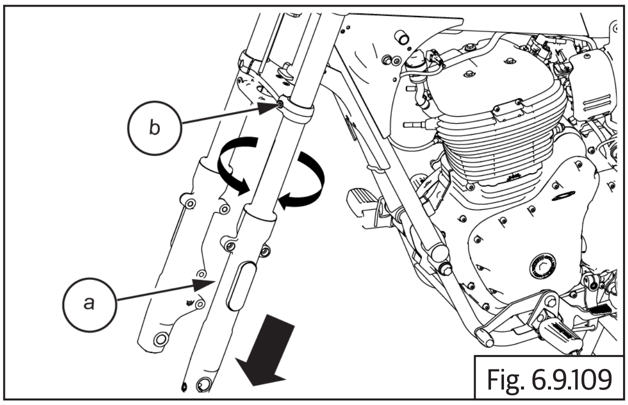


Fig. 6.9.109

⚠ CAUTION

Support headlamp holder while removing fork assembly.

- Repeat above steps to remove the fork assembly RH **(a)**.

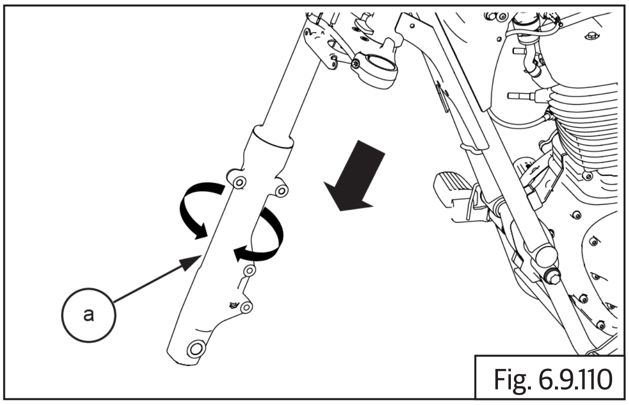


Fig. 6.9.110

6.9.2. Front Fork Sub Assembly LH and RH

⚠ CAUTION

The top cap nut is under pressure from the fork spring. Remove cap nut carefully and slowly while unscrewing from main tube.

- Loosen and remove cap nut **(a)** along with O-ring from upper end of front fork leg **(b)**.

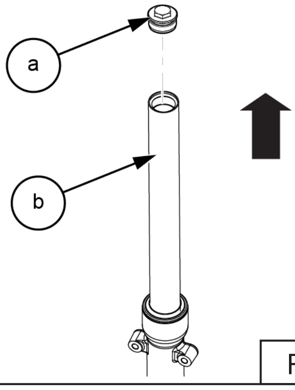


Fig. 6.9.111

🔧	36 mm Ring spanner

- Remove plate **(a)**.

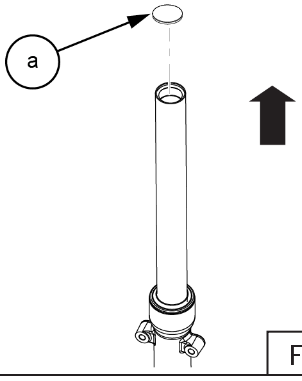


Fig. 6.9.112

- Gently pull out the spacer tube **(a)**.

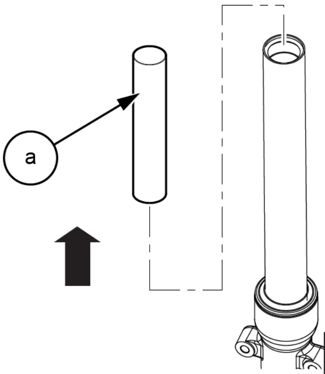


Fig. 6.9.113

- Gently invert fork assembly **(a)** into a clean tray to collect the fork oil coming out of main tube.

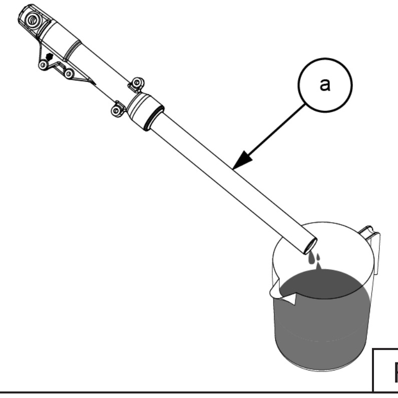


Fig. 6.9.114

⚠ **CAUTION**
Support the washer and main spring to prevent them from falling out when the oil has been drained.

- Remove washer **(a)**.

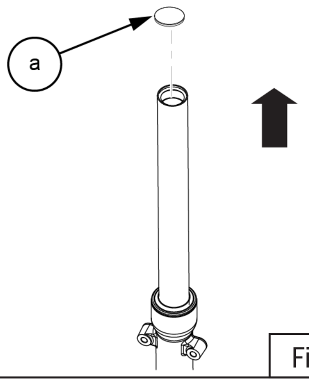
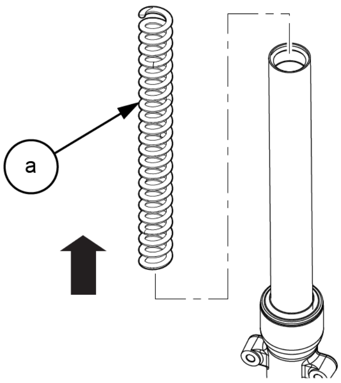


Fig. 6.9.115

- Remove main spring **(a)**.



- Hold fork **(a)** inverted and pump main tube into fork end several times till oil in the fork end drains out completely.

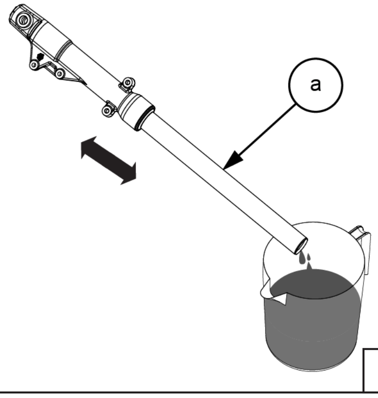


Fig. 6.9.117

- Insert special tool **(a)** into fork main tube **(b)** to lock and hold piston head inside.

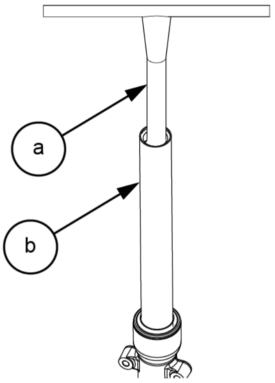
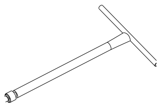


Fig. 6.9.118

SPL 	Part No:
	Part Name: Fork damper tube holder

- Remove Hex socket head screw **(M10)** **(a)** along with washer **(b)** from fork end.

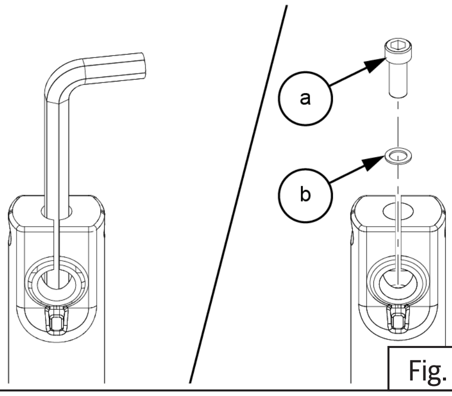


Fig. 6.9.119

	8 mm Allen key

- Remove the special tool from fork main tube.
- Gently lift dust cap out of fork end **(a)** and remove completely.

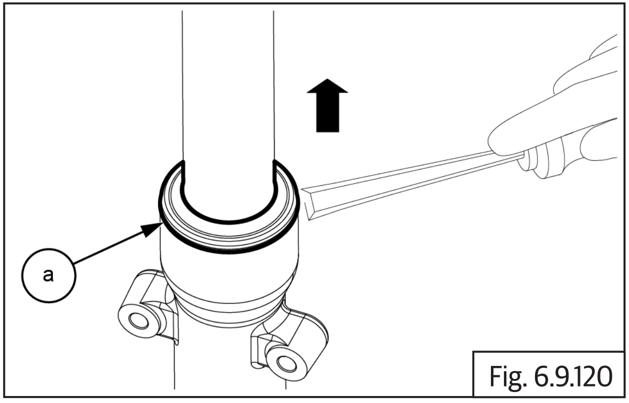


Fig. 6.9.120

	Chisel flat end

- Remove wire clip **(a)** from bottom tube.

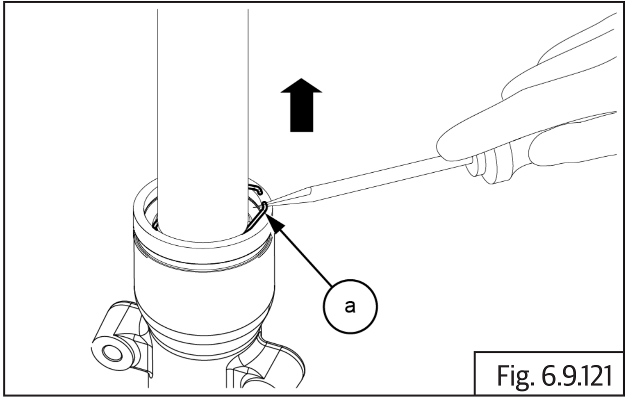


Fig. 6.9.121

	Chisel pointed

- Hold bottom tube firmly and pull out main tube sharply, to release oil seal and aluminum spacer from bottom tube.
- Pull out main tube **(a)** completely from bottom tube **(b)**.

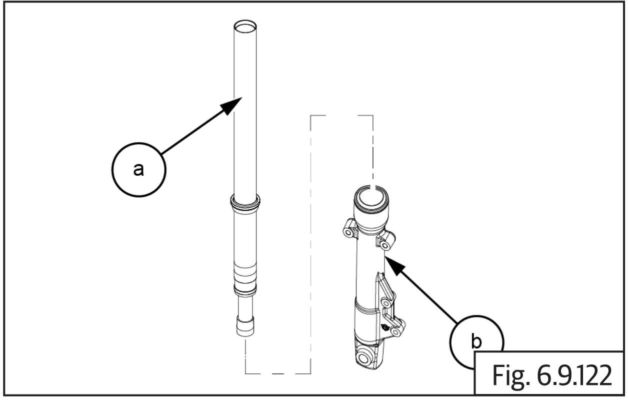


Fig. 6.9.122

- Remove the oil seal **(a)** from main tube **(b)** from top end.

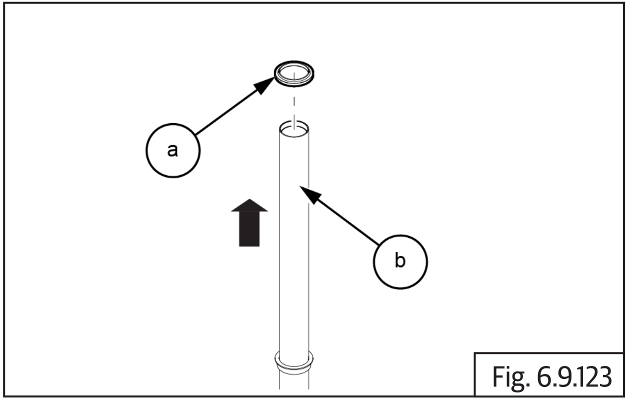


Fig. 6.9.123

- Remove spacer **(a)** from main tube **(b)** from top.

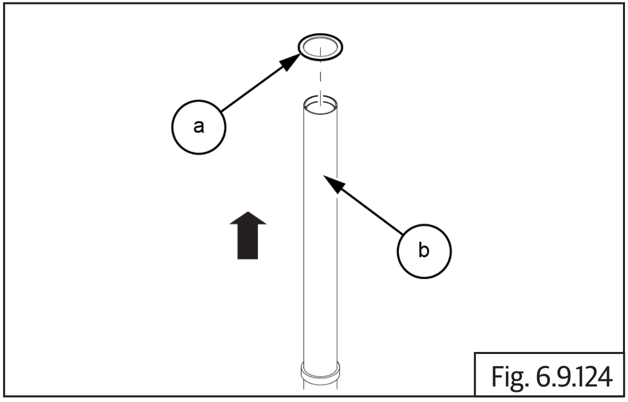


Fig. 6.9.124

- Remove aluminum split bush **(a)** from main tube **(b)** bottom.

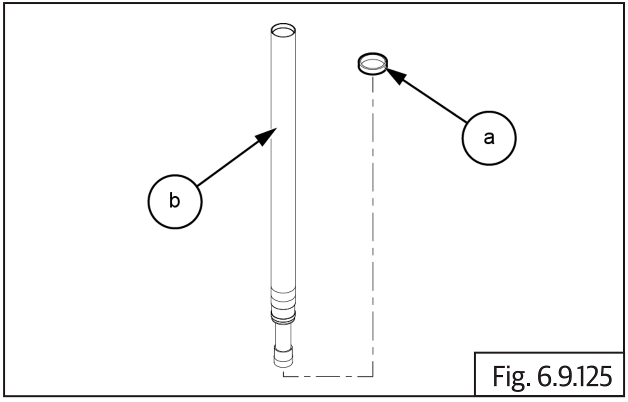


Fig. 6.9.125

- Remove tapper oil lock **(a)** from piston bottom **(b)** inside fork end.

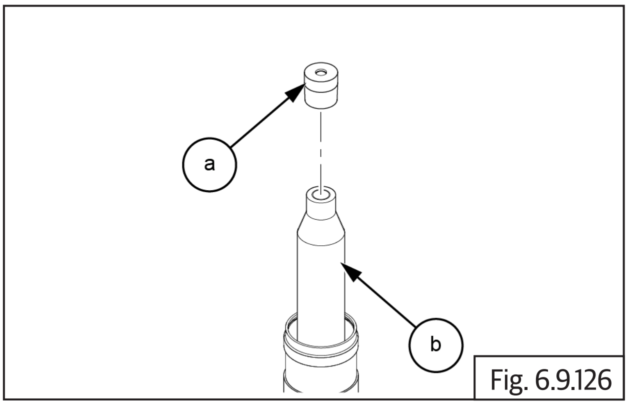


Fig. 6.9.126

- Tilt main tube up-side down and remove piston assembly **(a)** along with damper spring from main tube **(b)** inner.

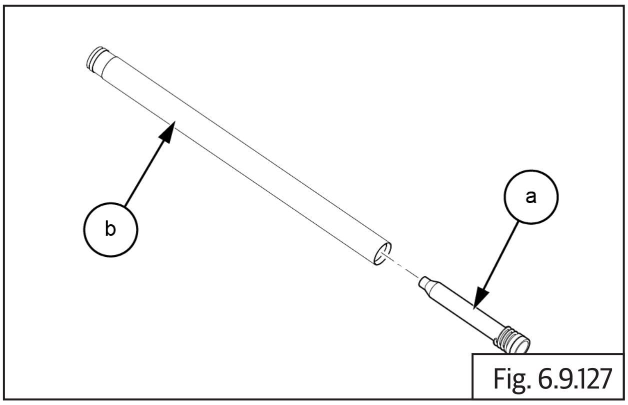


Fig. 6.9.127

- Remove damper spring **(a)** from piston **(b)**.

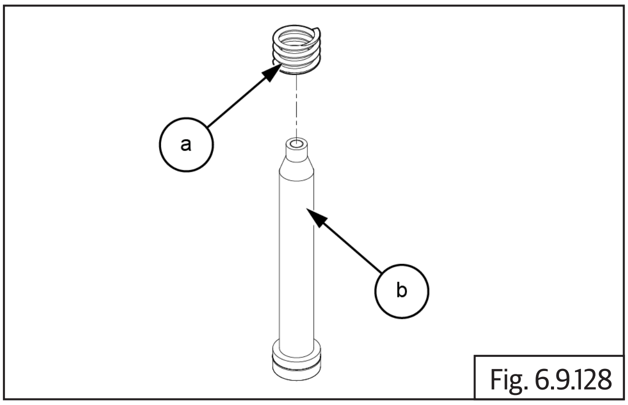


Fig. 6.9.128

6.9.3. Steering Stem Assembly from Frame Head Tube

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Locate a scissor jack **(a)** under the cradle frame **(b)** and lift motorcycle such that the front wheel is off the ground by minimum 6 inches (or 15 cm).

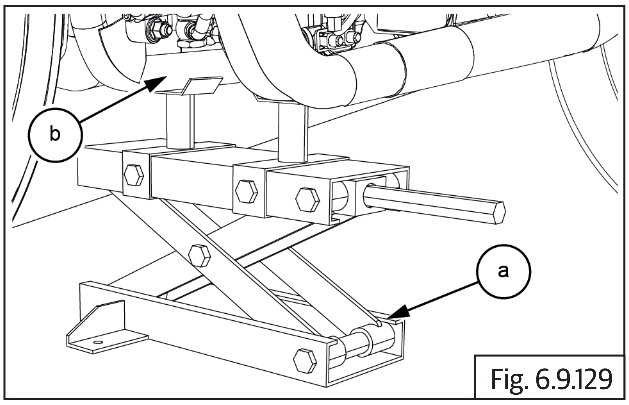


Fig. 6.9.129

- Ensure ignition and stop switch are in off position.
- Remove the following parts:
  - Front wheel (section 6.8.1).
  - Release brake hose and wheel speed sensor wires from the clips (section 9.3.2).
  - Wheel caliper from fork end LH (section 9.1.2). Support caliper suitably.
  - Wheel speed sensor from the fork end LH (section 9.3.2). Support wheel speed sensor suitably.
  - Front mudguard (section 6.6.2).
  - Front number plate (section 6.6.1).
  - Headlamp assembly and housing (section 11.1).
  - Trafficators (section 11.1.6).
  - Fork LH and RH (section 6.9.1).
  - Disconnect ignition switch connector (section 11.1.4).
  - Disconnect instrument cluster wiring connector (section 11.1.4).
  - Instrument cluster from top yoke (section 11.1.7).

- Loosen and remove 2 Nos. Hex socket head screws **(M8) (a)** from clamp holding handlebar to top yoke.

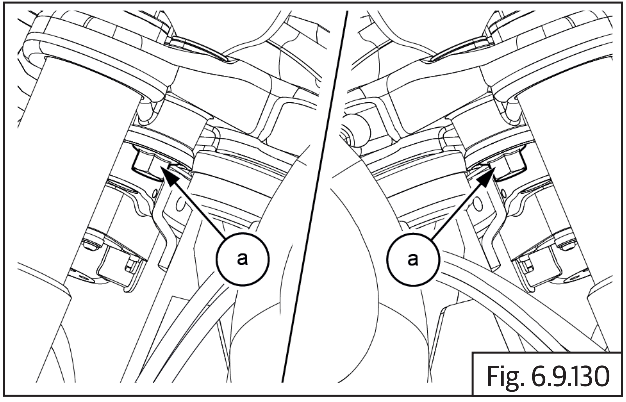


Fig. 6.9.130

	6 mm Allen socket with Ratchet

⚠ CAUTION

Support handlebar suitably to prevent damage to master cylinder and controls.

- Remove the steering top nut protective boot **(a)** from top yoke.

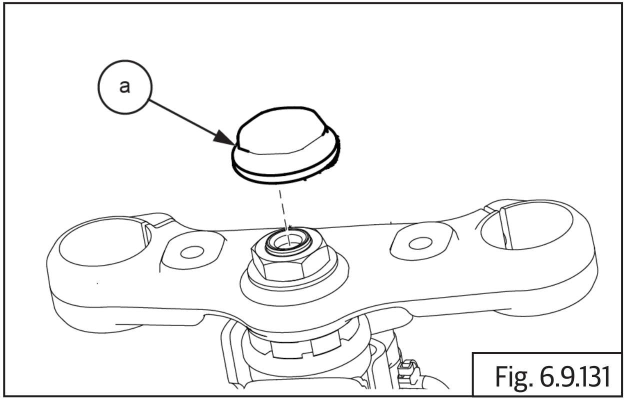


Fig. 6.9.131

	Screw Driver

- Loosen and remove top yoke nut **(a)** along with washer **(b)**.

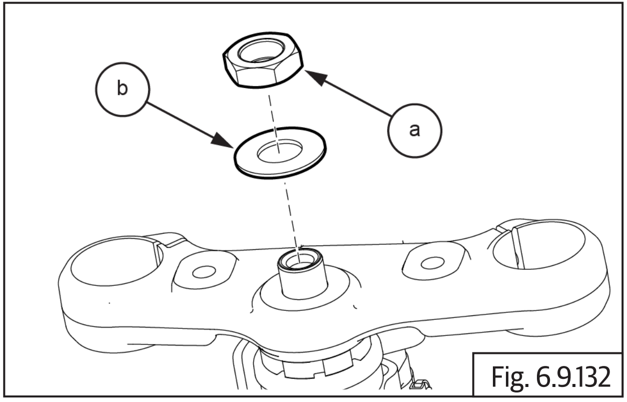


Fig. 6.9.132

	30 mm Hex Socket with Ratchet

- Ensure free movement of top yoke in steering stem and gently pull out top yoke **(a)** from steering stem.

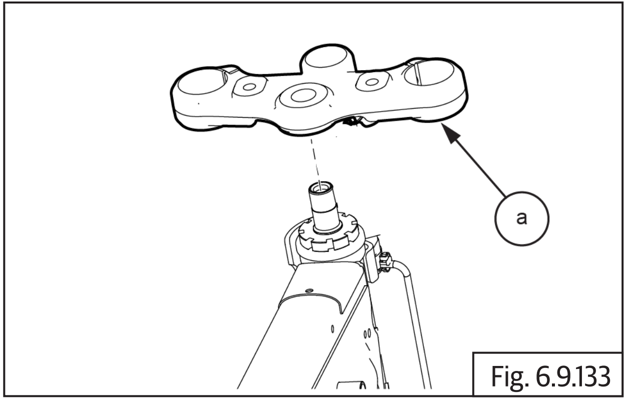


Fig. 6.9.133

- Turn steering stem to extreme left, loosen and remove stem nut **(a)**.

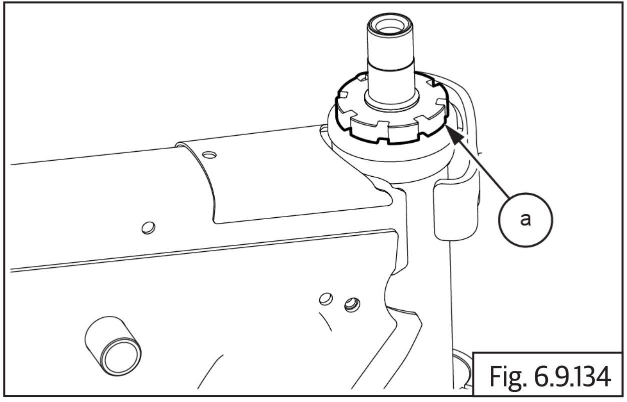
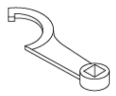


Fig. 6.9.134

SPL 	Part No:
	Part Name: Stem Nut Removal Tool

⚠ CAUTION

Support steering stem from bottom. DO NOT allow the steering stem to drop out of frame head tube.

- Hold steering stem from bottom and remove cover head stock **(a)**.

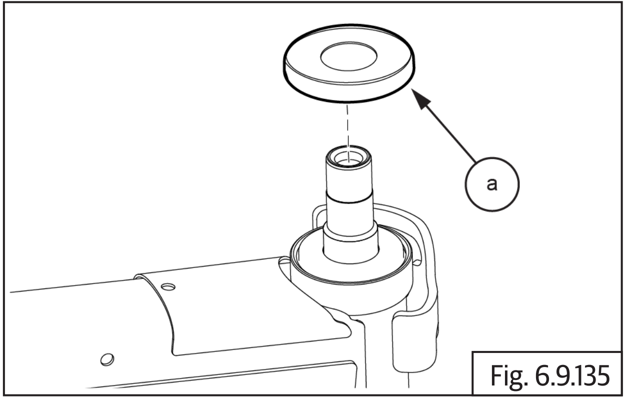


Fig. 6.9.135

- Hold steering stem from bottom and remove seal head stock **(a)**.

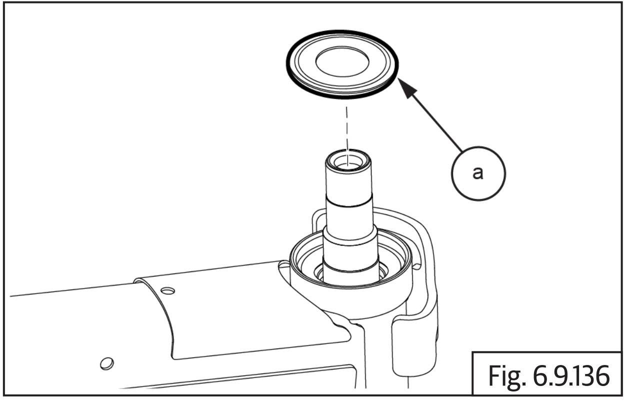


Fig. 6.9.136

- Remove the bearing guide **(a)**.

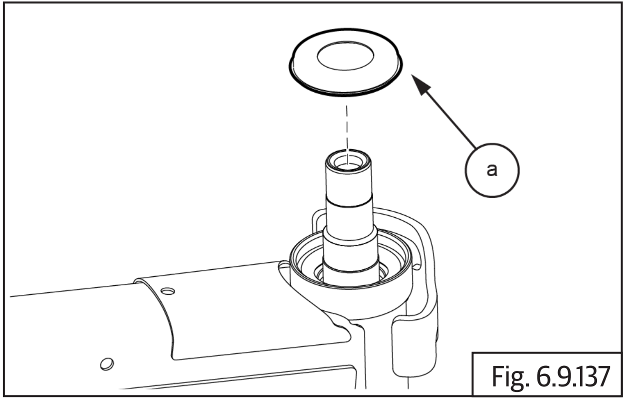


Fig. 6.9.137

- Gently remove the roller bearing **(a)** from the frame headstock.

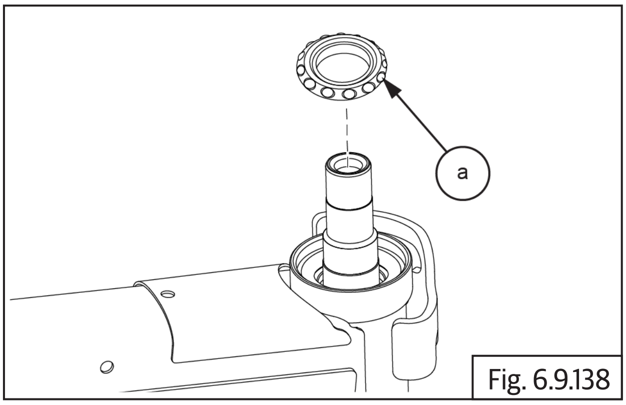


Fig. 6.9.138

- Gently pull and remove the T Stem **(a)** from the bottom of the frame.

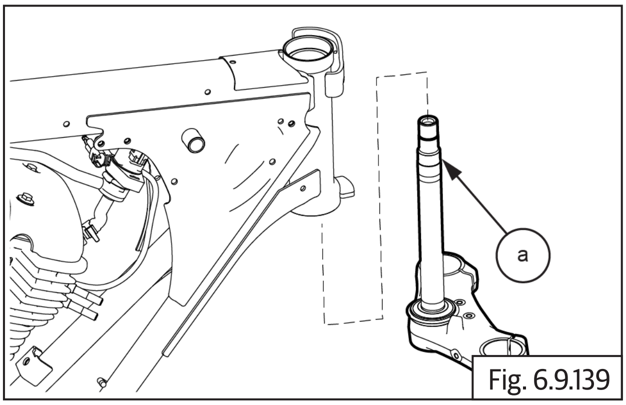


Fig. 6.9.139

- Remove the bearing **(a)** from the bottom of the stem.

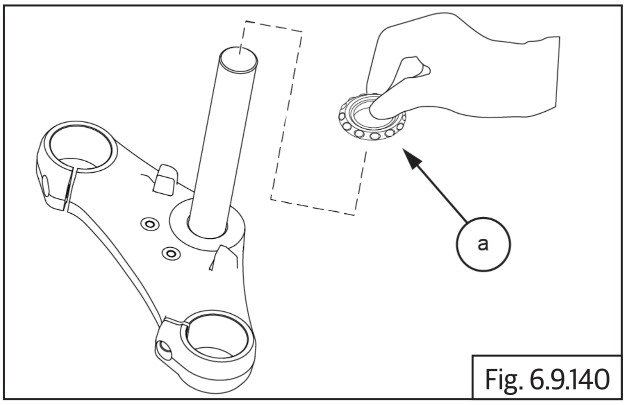


Fig. 6.9.140

6.9.5. Shock absorber

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Locate a scissor jack **(a)** under the cradle frame **(b)** and support motorcycle such that the rear wheel is on the ground.

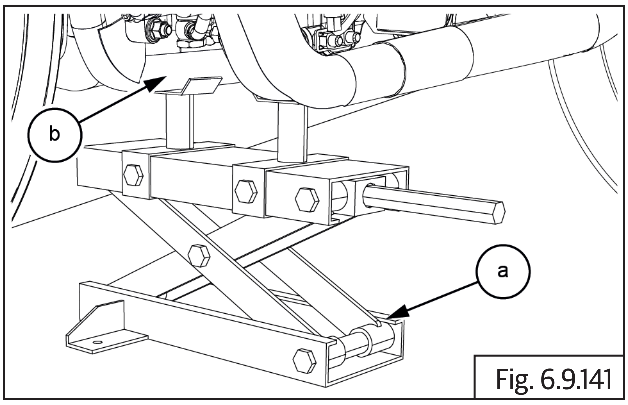


Fig. 6.9.141

- Loosen and remove top mounting bolt **(M8) (a)** from shock absorber **(c)** top and frame **(b)** RH.

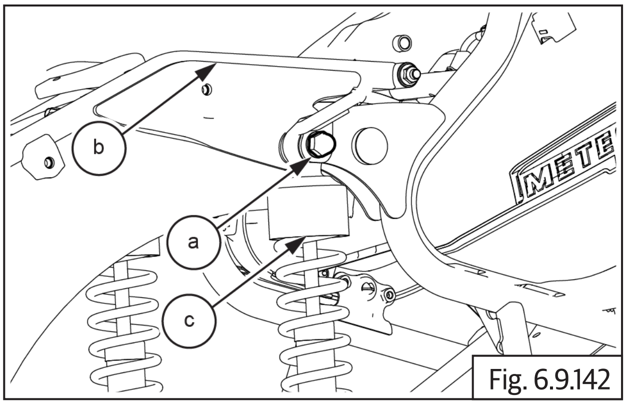


Fig. 6.9.142

🔧	17 mm Socket with Ratchet

- Support rear wheel, loosen and remove **(M10) (a)** from the shock absorber bottom **(b)** and swingarm RH **(c)**.

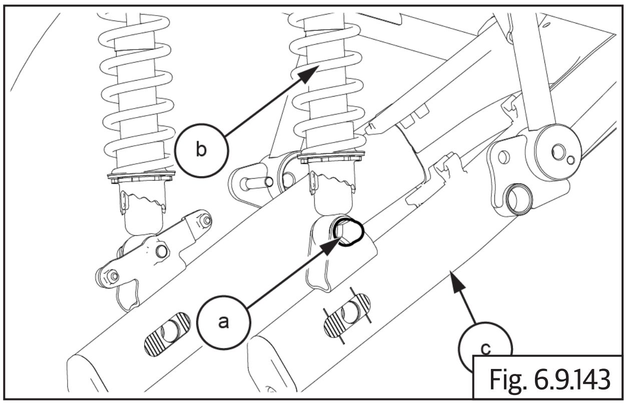


Fig. 6.9.143

🔧	17 mm socket with ratchet

- Gently remove RH shock absorber from swingarm bracket.
- **Repeat the above process to remove LH shock absorber.**

⚠ CAUTION

Ensure motorcycle is supported suitably at the rear end after removing both shock absorbers to prevent motorcycle from tipping over and falling down.

6.9.6. Sub Frame

- Loosen and remove hex head bolt **(M6) (b)** from subframe **(a)**.

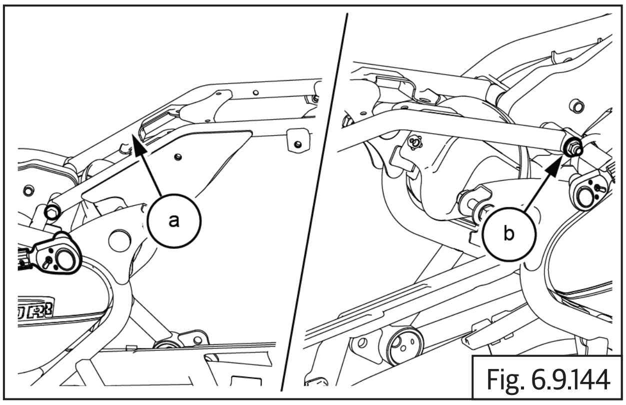


Fig. 6.9.144

🔧	12 mm Socket with Ratchet

- Remove subframe **(a)** from main frame **(b)**.

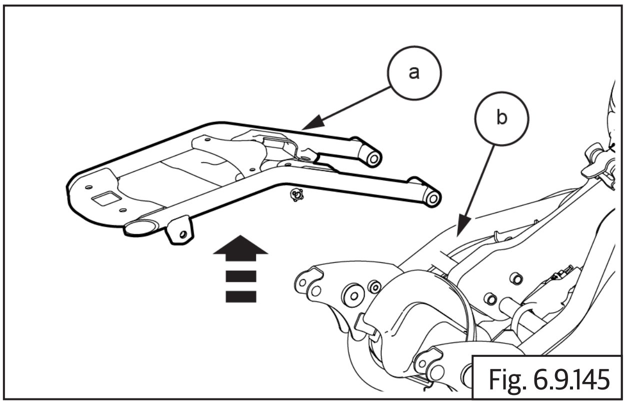


Fig. 6.9.145

6.9.6. Swingarm

- Remove the following parts:
  - Rear wheel (section 6.8.3).
  - Rear shock absorber LH and RH (section 6.9.5).

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface. Support the motorcycle firmly while removing the swingarm.

- Remove cap **(a)** covering the swing arm spindle

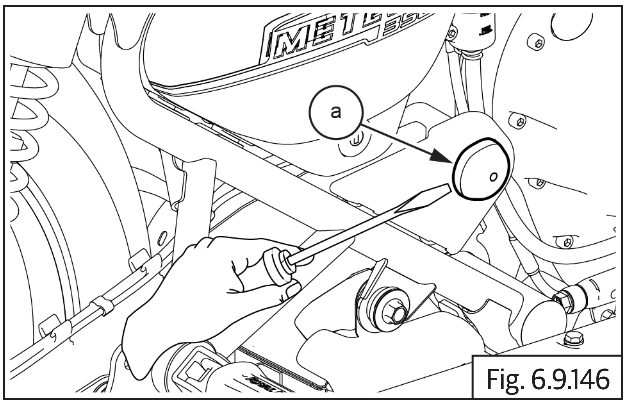


Fig. 6.9.146

Screw driver

- Remove 1 Nos **(M6) (a)** bolt to remove the shield covering the swing arm spindle

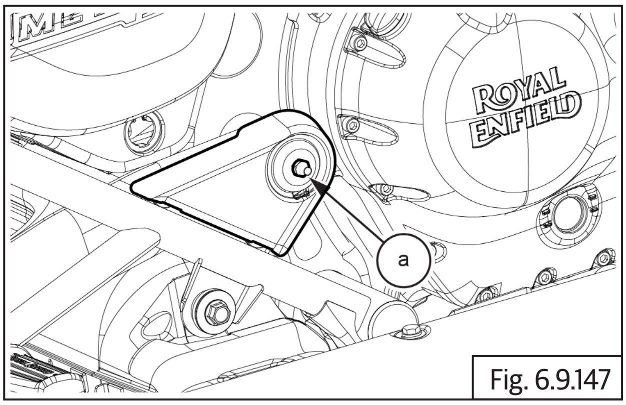


Fig. 6.9.147

10 mm Socket with Ratchet

- Hold spindle bolt **(M16)** in frame LH side and loosen and remove hex nut **(M16) (a)** with washer **(b)** from RH side.

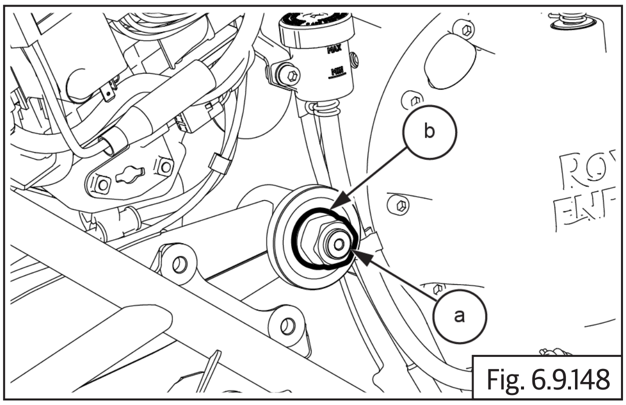


Fig. 6.9.148

24 mm Socket with T-handle
24 mm Socket with Ratchet

- Provide suitable support below swingarm **(a)** and pull out spindle **(b)** and washer from LH side.

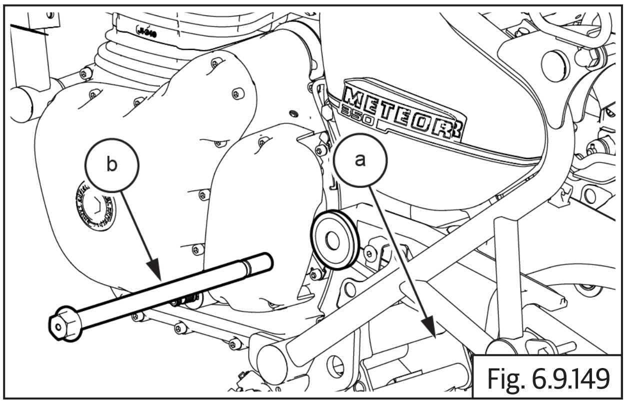


Fig. 6.9.149

- Loosen and remove 3 Nos. Hex socket button bolts **(M6) (a)** to separate chain guard **(b)** from swingarm RH.

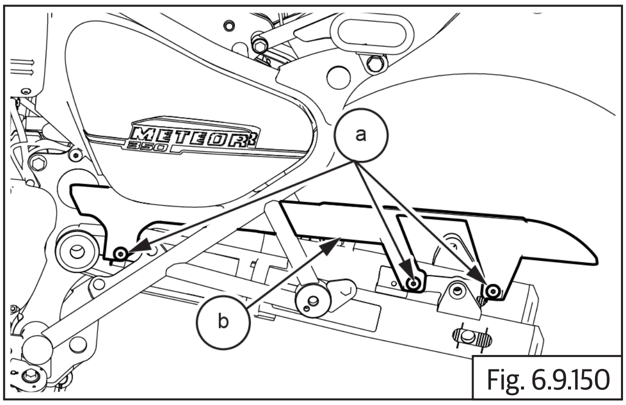


Fig. 6.9.150

5 mm Allen key

- Rotate swingarm slightly and release drive chain **(a)** from swingarm **(b)**.

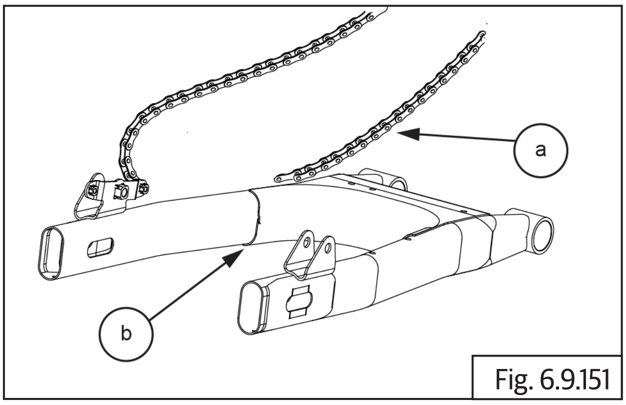


Fig. 6.9.151

- Remove end cup **(a)** from swingarm LH and RH.

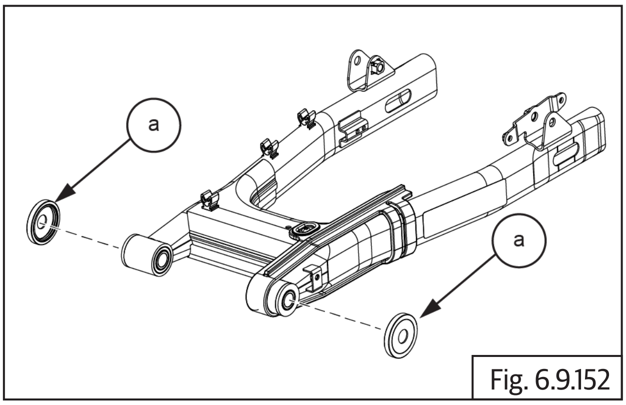


Fig. 6.9.152

- Remove bush **(a)** from swingarm LH and RH.

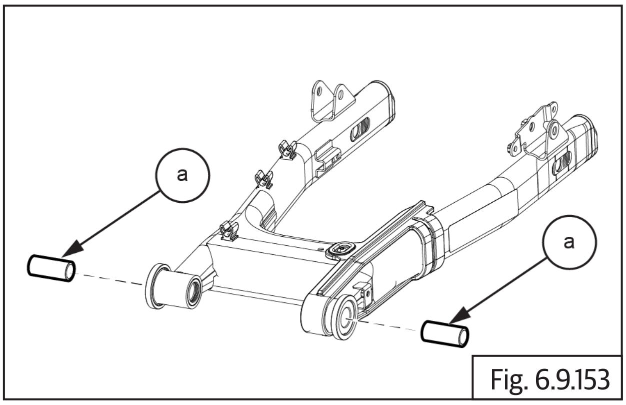


Fig. 6.9.153

- Loosen and remove 2 Nos. Hex socket button head bolts **(M6)** **(b)** to remove chain rubber strip **(a)**.

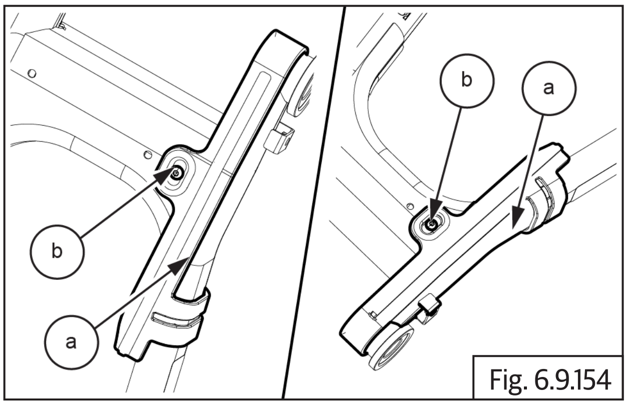


Fig. 6.9.154

🔧	5 mm Allen key

Inspection

6.9.7. Front Fork Leg

- Inspect main tube for any scratches in the working area. Replace if scratched.

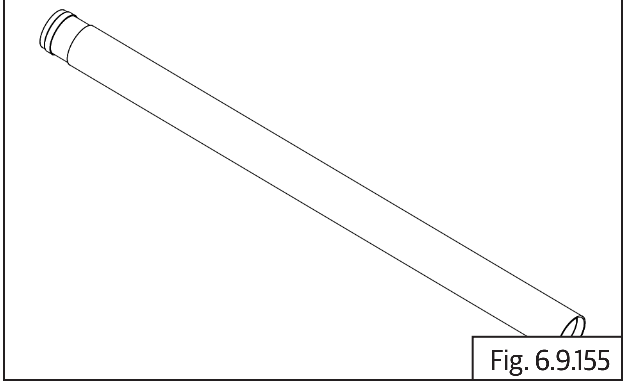


Fig. 6.9.155

- Fork pipe runout, service limit 0.2 mm.
- Inspect main tubes for any bends using dial gauge.
- Inspect fork ends inner side for any damages and scratches. Replace if found damaged.
- Inspect fork ends for any cracks- especially at oil seated area. Replace if cracked.
- Inspect piston for any damages/scratches. Replace if damaged.
- Inspect main spring for any coil breakage/ reduction in free length and replace. Service limit 382 mm.
- Inspect damper spring for any coil breakage/ reduction in free length and replace.
- Main spring free length 390±4.0 mm.

6.9.8. Front Fork Air Gap Setting

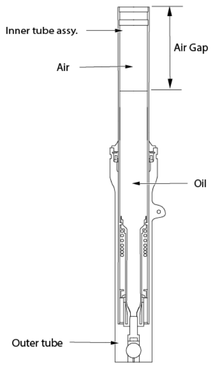


Fig. 6.9.156

- Remove fork leg (LH & RH) assembly from the vehicle.
- Disassemble all parts of the fork external and internal parts with cleaning agent and leave to dry.
- Reassemble fork leg assembly with out main spring, washer spring top, spacer tube, washer-2 and top bolt cap Assy.
- Set the fork leg assembly in a vice or flat surface and ensure it is vertical.
- Fully compress the inner tube assembly in the outer tube untill it bottoms out.
- using a cylinder jar measure 453 cc of Fork Oil.
- Fill the oil through inner tube top side.
- Hold the outer tube fully extend and fully compress (Stork) the inner tube assy 20-times.
- Fully compress the inner tube assembly and leave for 30- minutes to allow the air to bleed out.
- Measure the height of the oil (Air Gap) using a fork Vernier calliper.

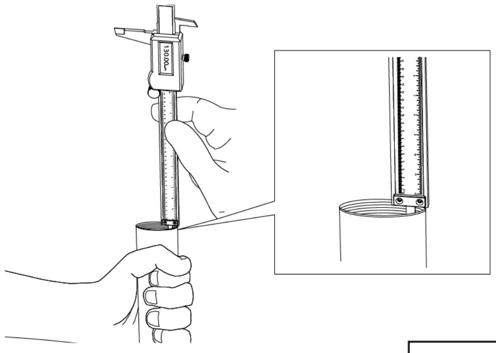


Fig. 6.9.157

- Make verrnier “zero”, unlock the screw and move the verrnier scale towards oil trace side.

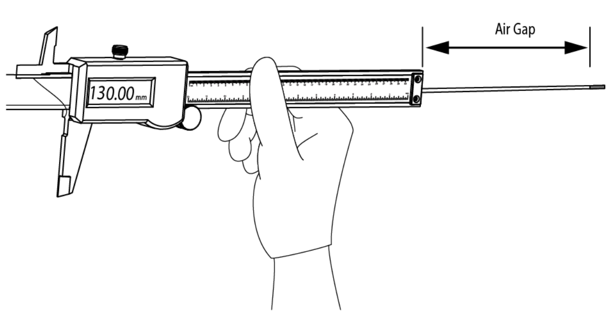


Fig. 6.9.158

- When main scale touch the oil trace, the value is air gap in front fork.

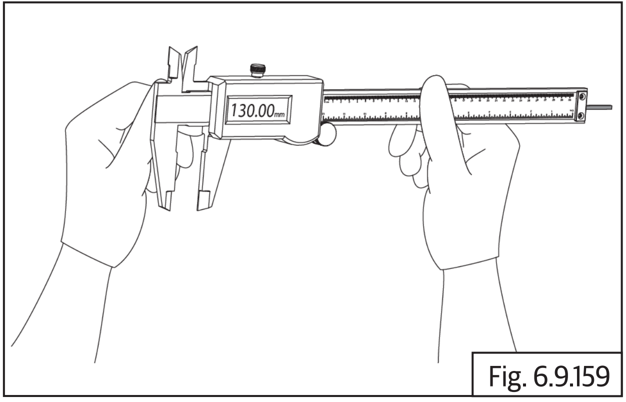


Fig. 6.9.159

6.9.9. Steering Stem

- Inspect and replace roller bearing **(a)** if it has rusting, uneven wear of rollers and/or rollers are falling out of cage.

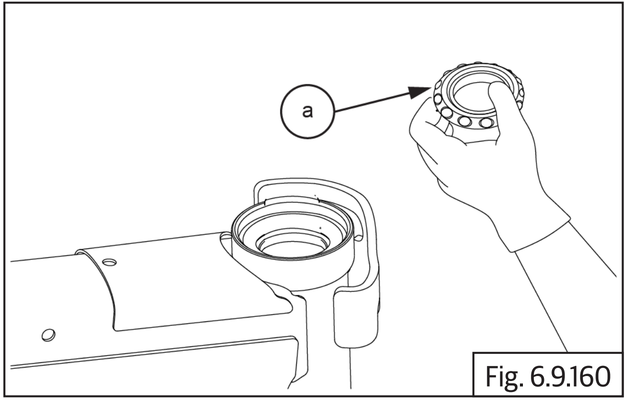


Fig. 6.9.160

- Inspect bearing cups for rust, pitting and uneven wear. Replace if damaged.
- Inspect steering stem **(a)** for any bends or damages. Replace if damaged.

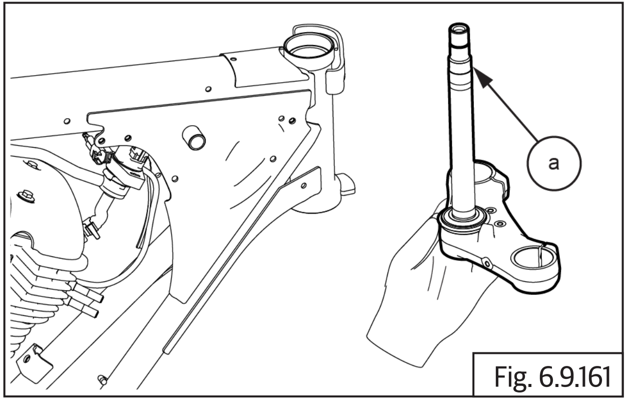


Fig. 6.9.161

6.9.10. Shock absorber

- Inspect shock absorber for damaged canister, spring coil breakage, oil leaks, weak or hard action of shock absorber. Replace if found.
- Inspect mounting hole rubber inserts for any tear or damage. Replace shock absorber.
- Inspect and replace shock absorber if it has any bends, cracks or rusting.

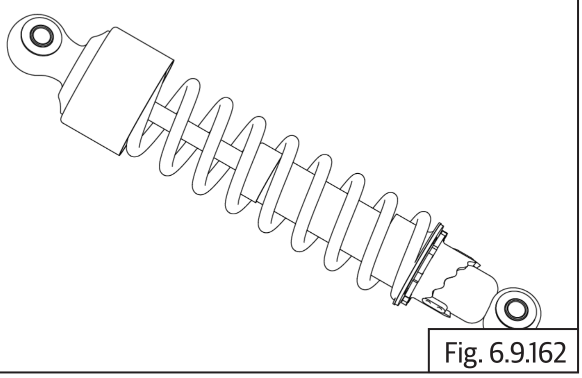


Fig. 6.9.162

6.9.11. Swingarm

- Inspect swingarm for any damages or bends.
- Inspect swingarm in fully assembled condition in motorcycle for side play, sticky movement in working area and replace sleeve if necessary.
- Inspect if swingarm end cup is worn-out or damaged.
- Inspect spindle for any wear-out or bend.

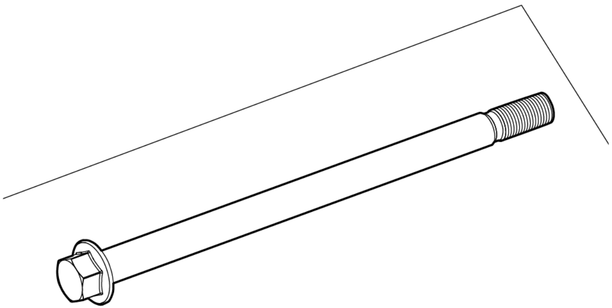


Fig. 6.9.163

6.9.12. Top Yoke

- Inspect top yoke for any cracks or damages in seating area. Replace if damaged.

Replace

- Replace oil seals, dust seals, washers, chain guides whenever removed from the front fork/swingarm.
- Always fill up front fork with recommended oil from a new container. **DO NOT reuse the oil**.

Assembly

6.9.13. Swingarm

⚠ CAUTION
Ensure the motorcycle is upright on a firm and flat surface.

- Locate swing arm bush **(a)** and special tool in swing arm **(b).**

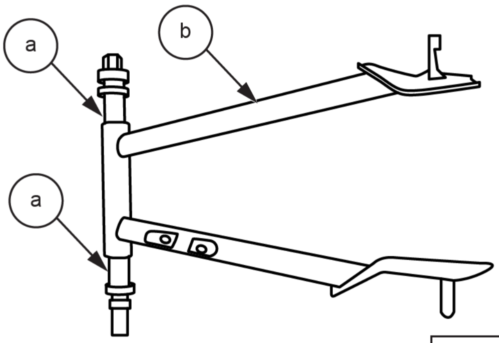


Fig. 6.9.164

SPL	Part No: ST31122/A
	Part Name: Swingarm Sleeve Installer

- Hold one end of the special tool with spanner **(a)** and tighten at other end with Hex socket and pneumatic gun **(b)**.

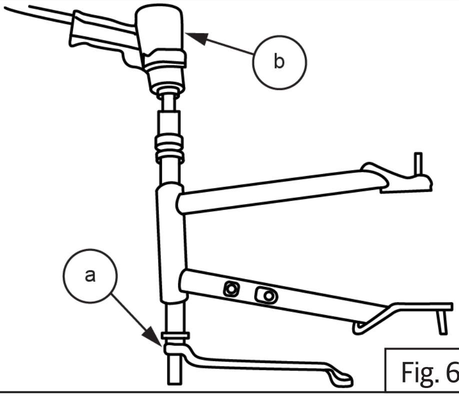


Fig. 6.9.165

	24 mm Double end Spanner and 24 mm Socket with Pneumatic gun.

- Locate rubber chain strap **(a)** on the LH side, align mounting holes and tighten with 2 Nos. Hex socket button head bolts **(M6) (b)**.

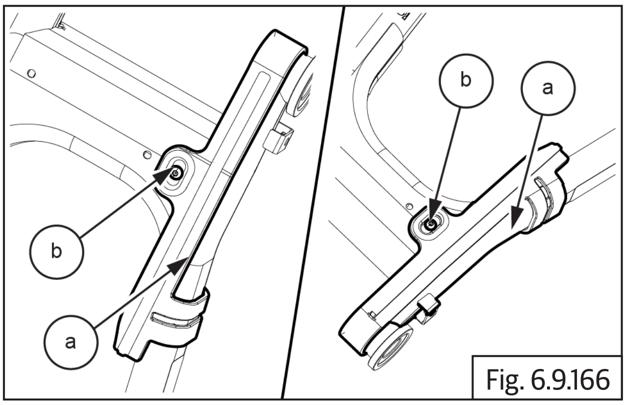


Fig. 6.9.166

🔧	5 mm Allen key
Torque	4-7 N-m/0.4-0.7 kgf-m

- Apply grease on the sleeve before installing.
- Locate sleeve **(a)** into swingarm LH and RH.

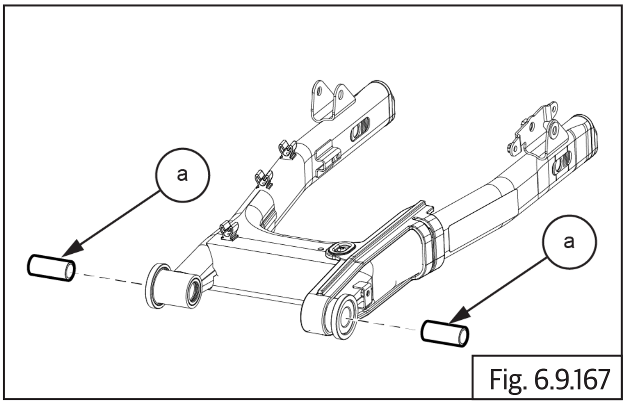


Fig. 6.9.167

- Assemble end cup **(a)** into swingarm LH and RH.

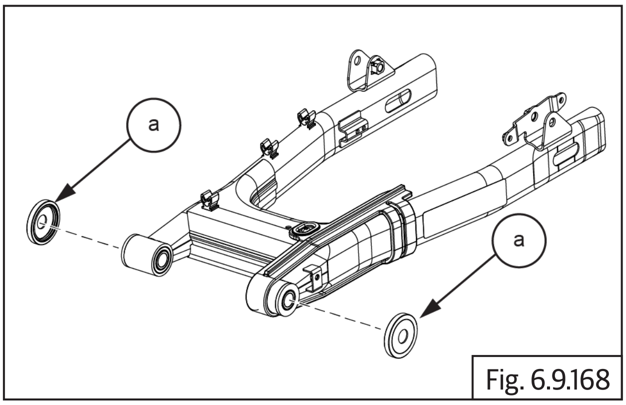


Fig. 6.9.168

- Insert drive chain **(a)** into swingarm **(b)** LH.

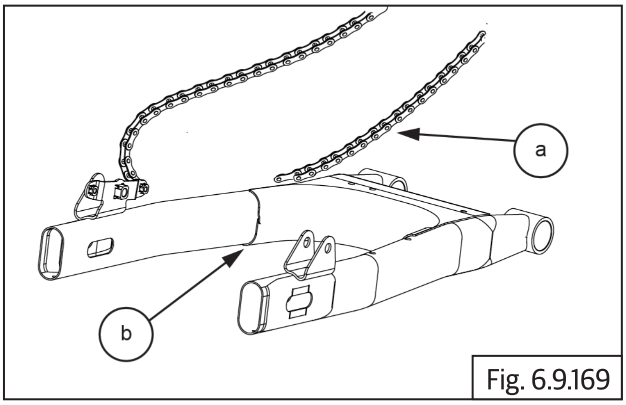


Fig. 6.9.169

- Locate and align chain guard front mounting hole on swingarm RH **(b)** and tighten with Hex socket button head bolt **(M6) (a)**.

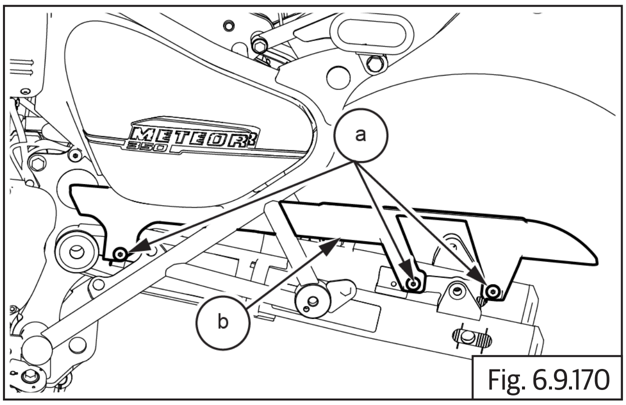


Fig. 6.9.170

🔧	5 mm Allen key
Torque	4-7 N-m/0.4-0.7 kgf-m

- Position swingarm assembly into frame and ensure mounting holes are aligned properly.

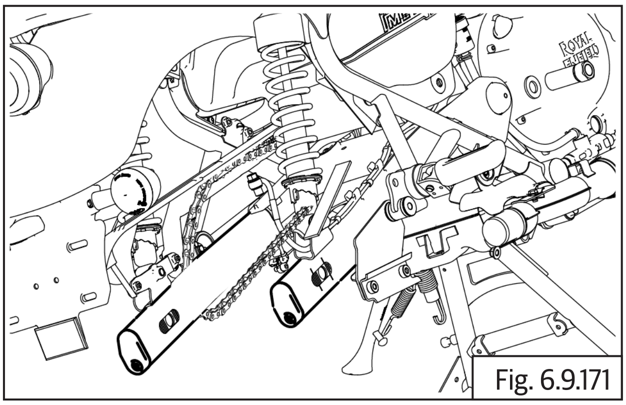


Fig. 6.9.171

- Insert spindle **(a)** from LH till it is located on the end cap with slots.

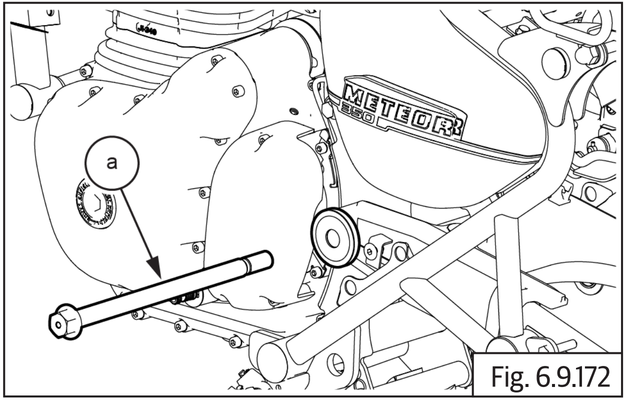

a
METEOR 350

Fig. 6.9.172

- Locate Hex nut **(M16) (a)** along with washer **(b)** on spindle.
- Hold spindle from LH side suitably and tighten nut.

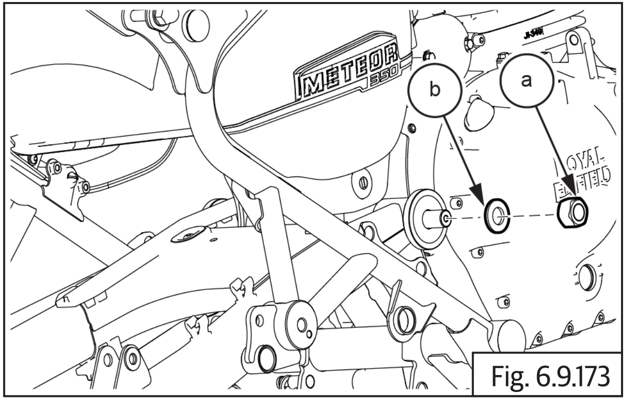

METEOR 350
b
a
ROYAL ENFIELD

Fig. 6.9.173

	24 mm Socket with Ratchet
Torque	66-74 N-m/6.6-7.4 kgf-m

- Locate swing arm spindle shield **(a)**.

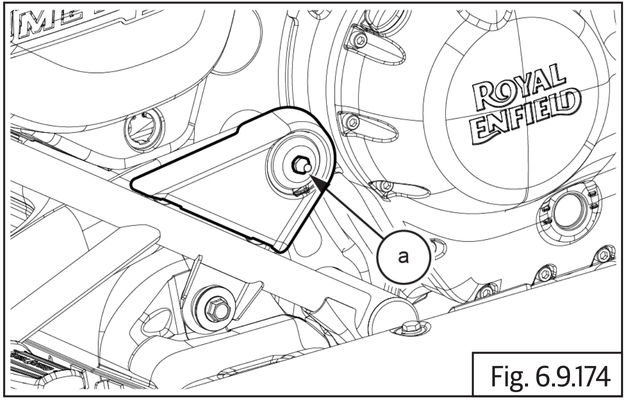

ROYAL ENFIELD
a

Fig. 6.9.174

- Insert mounting bolt **(a) (M6)** and tighten.

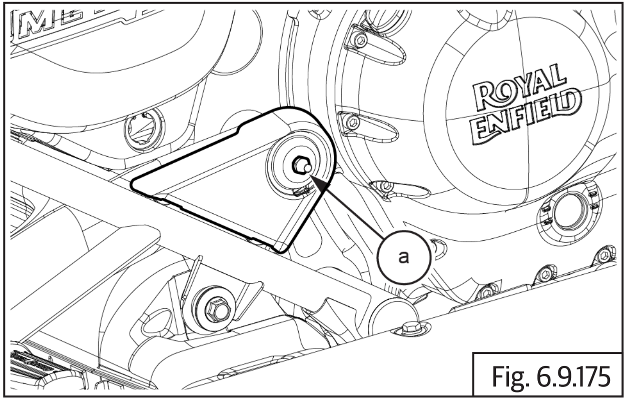

ROYAL ENFIELD
a

Fig. 6.9.175

	10 mm Socket with Ratchet
Torque	10-12 N-m/1.01.2 kgf-m

- Locate cover **(a)** over swing arm cover. Gently press to install.

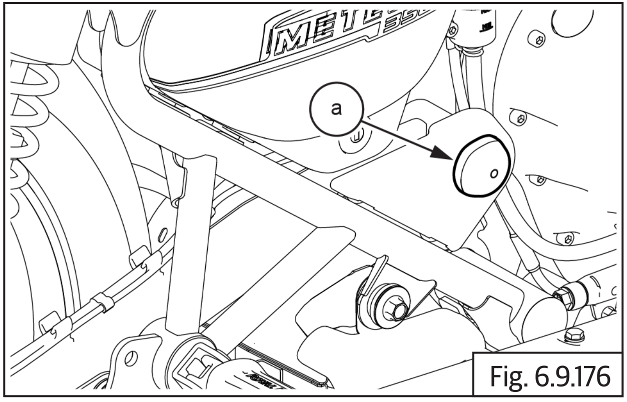


Fig. 6.9.176

6.9.14. Subframe

- Locate subframe **(a)** in mainframe **(b)**.

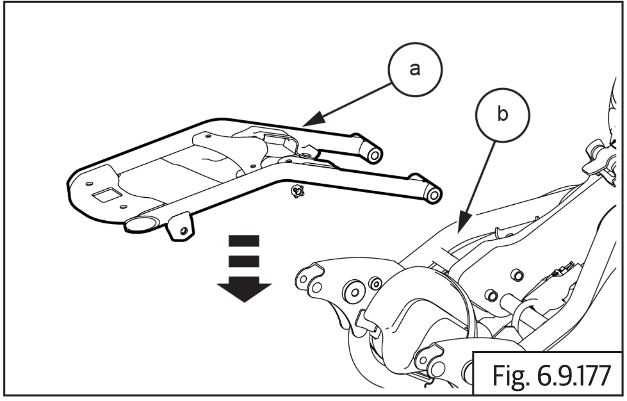


Fig. 6.9.177

- Locate and install hex head long bolt along with nut **(b)** in mainframe **(a)** .

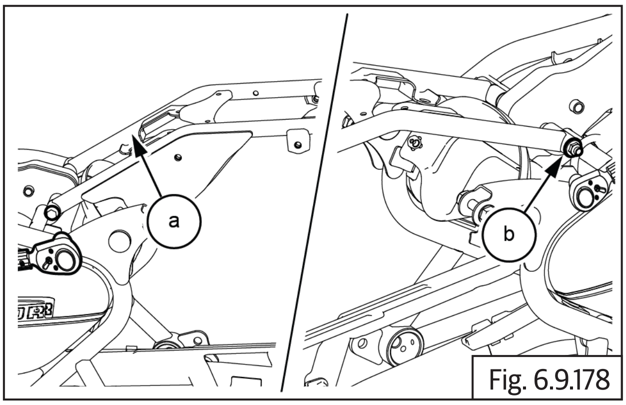


Fig. 6.9.178

	12 mm Socket with Ratchet
Torque	15-20 N-m/1.5-2.0 kgf-m

6.9.15. Shock Absorber

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Locate and align the shock absorber top **(a)** to mounting hole on frame LH **(b)** and tighten with hex flange bolt **(M10)** **(c)**.

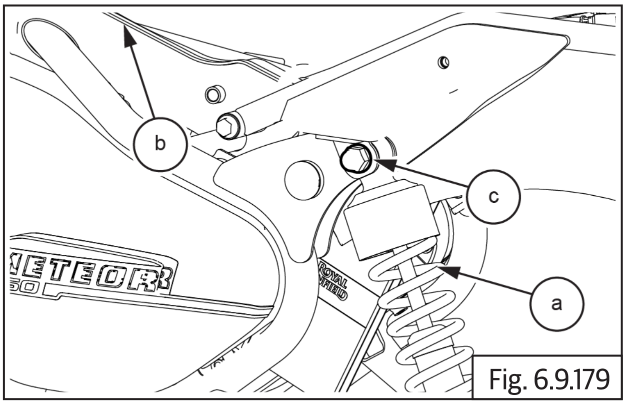


Fig. 6.9.179

	17 mm socket and Ratchet
Torque	32-38 N·m/3.2-3.8 kgf-m

- Align bottom mounting hole of shock absorber **(a)** to swingarm bracket LH **(b)** and tighten with button head bolt **(M8)** **(c)**.

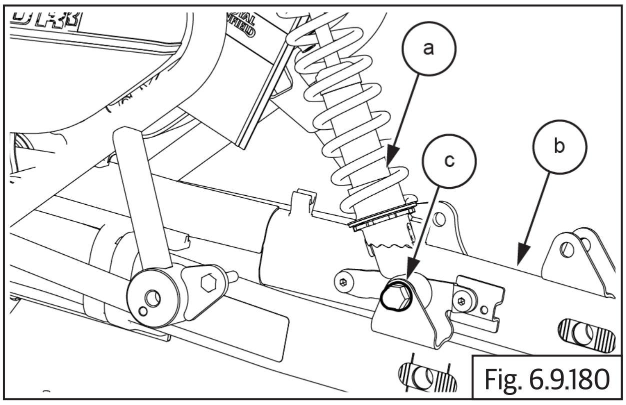


Fig. 6.9.180

	17 mm Allen socket and Ratchet
Torque	25-35 N·m/2.5-3.5 kgf-m

- Tighten both mounting bolts evenly to torque.
- Locate and align the shock absorber top **(c)** to the mounting hole on frame RH **(b)** and tighten with hex flange bolt **(M10)** **(a)**.

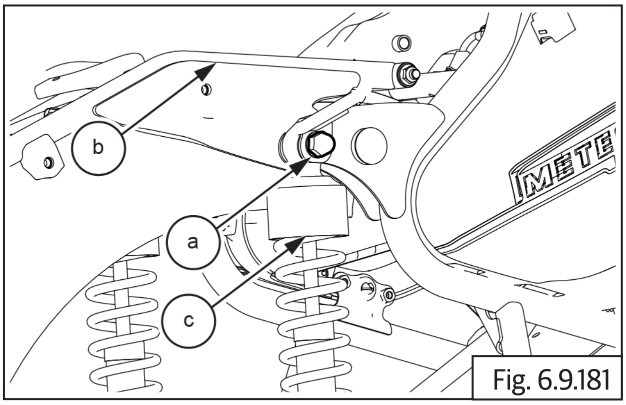


Fig. 6.9.181

	17 mm socket and Ratchet
Torque	32-38 N·m/3.2-3.8 kgf-m

- Align the shock absorber **(a)** bottom mounting hole to the swingarm bracket RH **(b)** and tighten with button head bolt **(M8) (c)**.

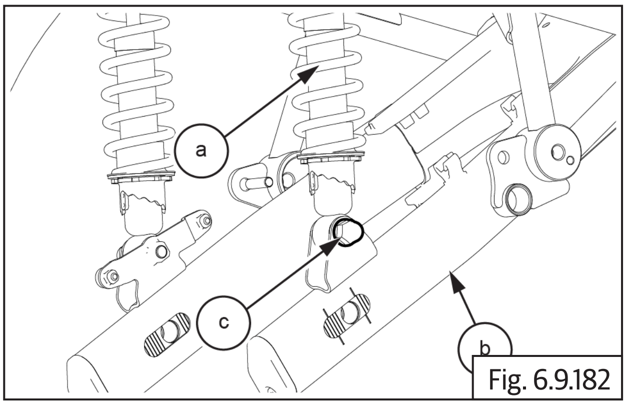


Fig. 6.9.182

🔧	6 mm Allen socket and Ratchet
Torque	25-35 N·m/2.5-3.5 kgf-m

6.9.15. Steering Stem Assembly into Frame Head Tube

- Insert the dust seal **(a)** and roller bearing **(b)**.

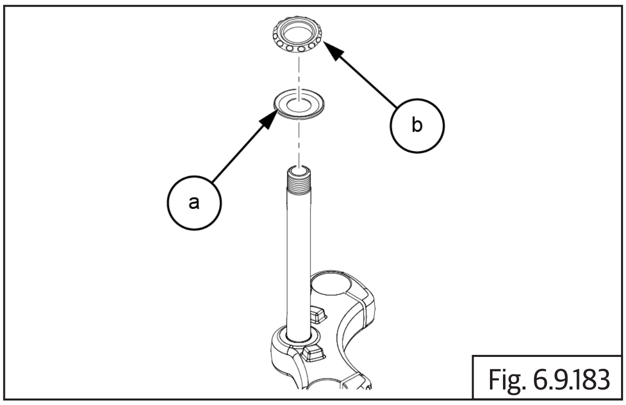


Fig. 6.9.183

6.9.17. Steering Stem on Frame Head Tube

- Apply Royal Enfield recommended grease on the bearing cups inner surface.
- Insert steering stem **(a)** into frame head tube from the bottom.

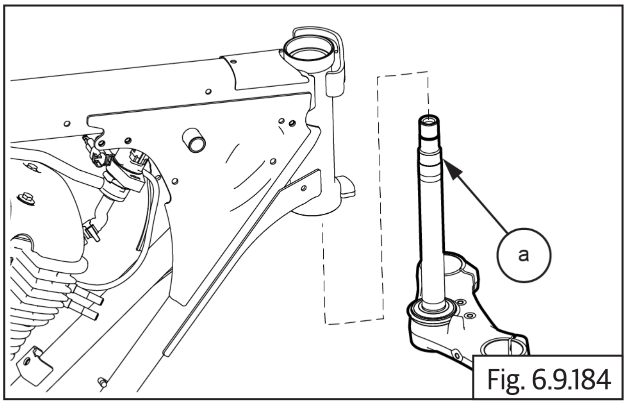


Fig. 6.9.184

⚠ CAUTION

Support steering stem from bottom. DO NOT allow the steering stem to drop out of frame head tube.

- Assemble headstock bearing with the taper facing upwards **(a)**.

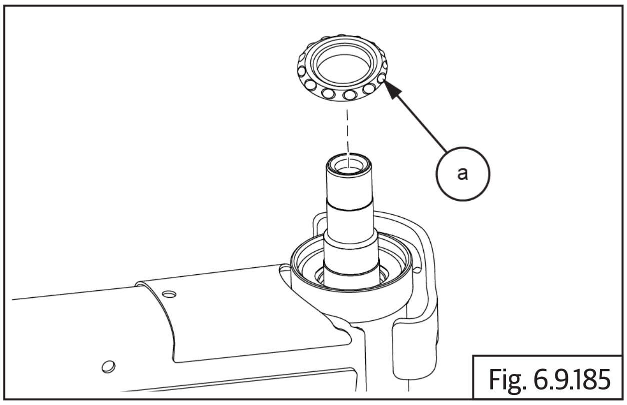


Fig. 6.9.185

- Assemble bearing guide **(a)** with the cup facing downwards.

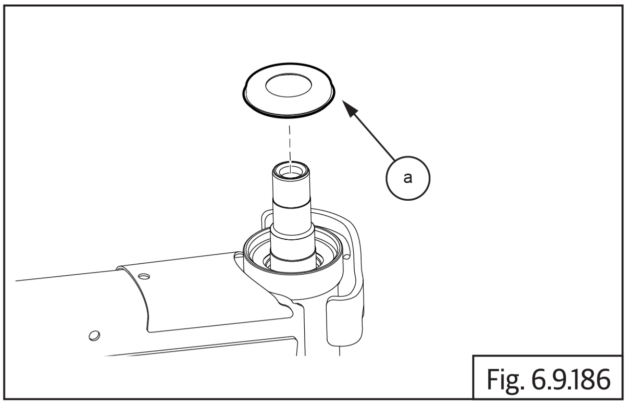


Fig. 6.9.186

- Assemble headstock seal **(a)** with the cup facing downwards.

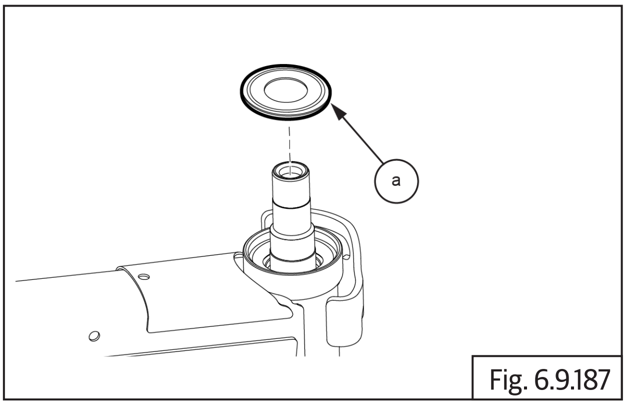


Fig. 6.9.187

- Assemble headstock seal **(a)** with the cup facing downwards.

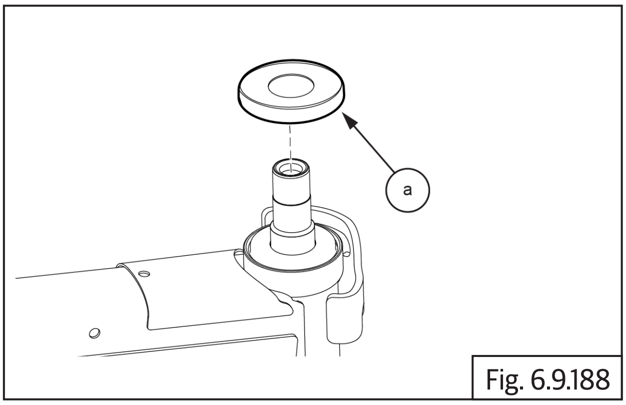


Fig. 6.9.188

- Assemble stem nut **(a)** on steering stem and tighten.

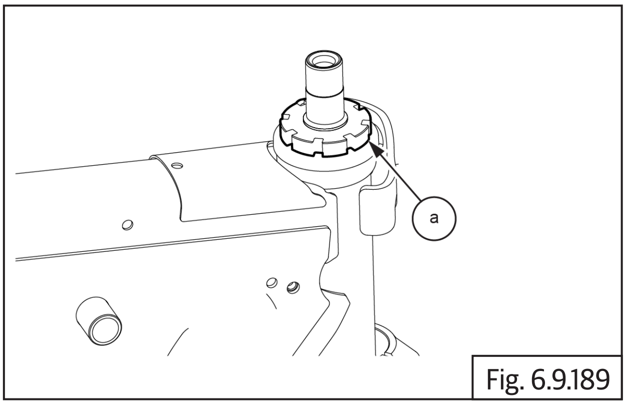


Fig. 6.9.189

Torque	1st Torque - 50 Nm Loosen - 110° 2nd Torque - 5-7 Nm

Check the following

- Check the free movement of steering stem from left to right.
- Check axial play of steering stem at center, extreme left and right positions.
- Check lateral play of steering stem at center, extreme left and right positions.

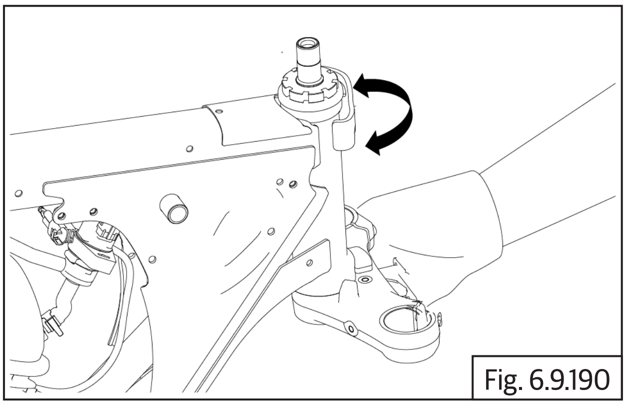


Fig. 6.9.190

- Tighten or loosen stem nut to ensure no axial or lateral movement is present and the steering movement is smooth.

⚠ CAUTION

DO NOT over tighten the nut. Over/under torquing will lead to improper adjustment of steering stem.

Check for smooth turning in left and right directions and tighten just sufficiently.

6.9.18. Top Yoke on steering stem

- Locate top yoke **(a)** over stem nut and ensure it is seated fully.

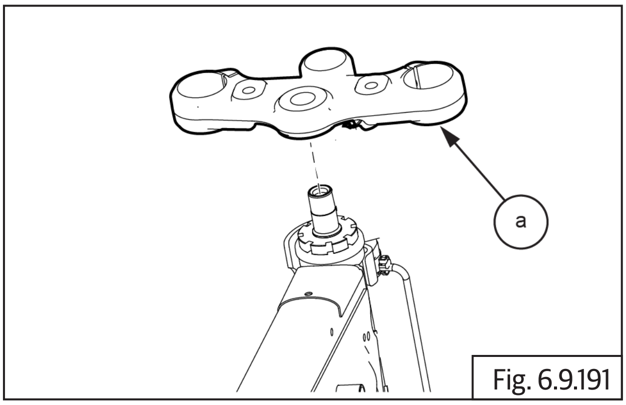


Fig. 6.9.191

NOTE

- *Pre-coat steering nut with LOCTITE 204 before assembling.*

- Assemble hex socket nut **(a)** and washer **(b)** into top yoke and tighten just sufficiently. **DO NOT TIGHTEN THE BOLT TO TORQUE**.

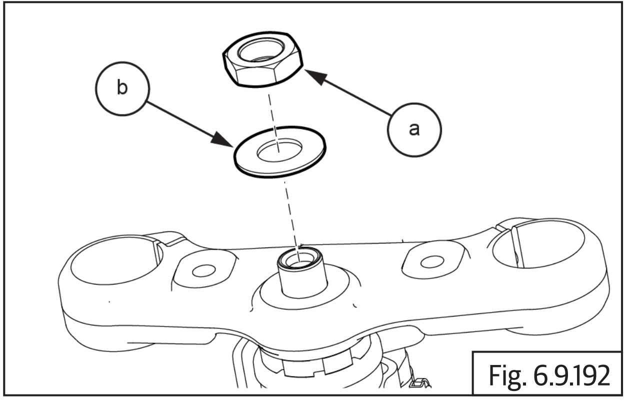


Fig. 6.9.192

	30 mm socket with Ratchet
Torque	50-60 N·m/5.0-6.0 kgf-m

6.9.19. Front Fork Sub Assembly LH and RH

- Assemble spring **(a)** into piston from the bottom end **(b)**.

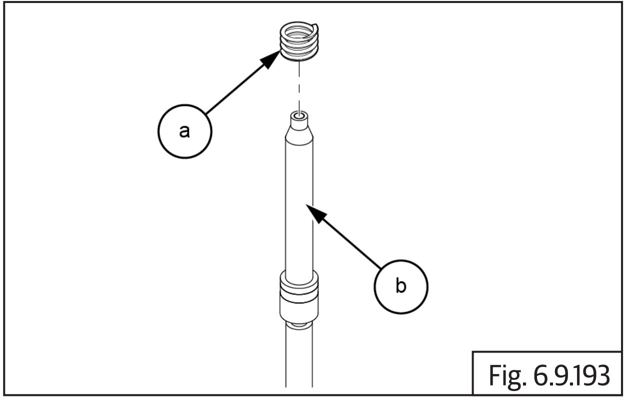


Fig. 6.9.193

- Locate special tool **(a)** on piston **(b)** with the piston facing upwards.

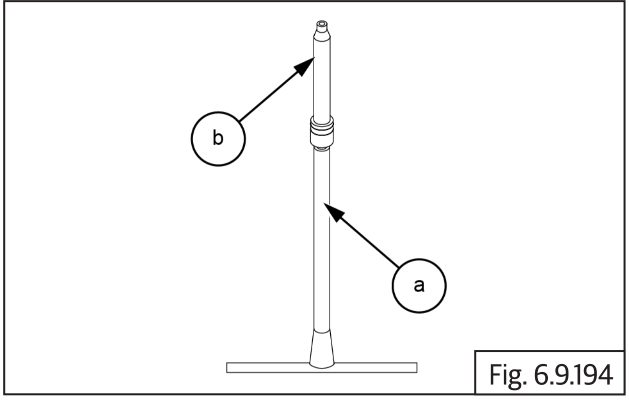


Fig. 6.9.194

SPL	Part No: ST26461-2
	Part Name: Fork damper tube holder

- Assemble slide bush **(a)** into main tube **(b)** from fork top.

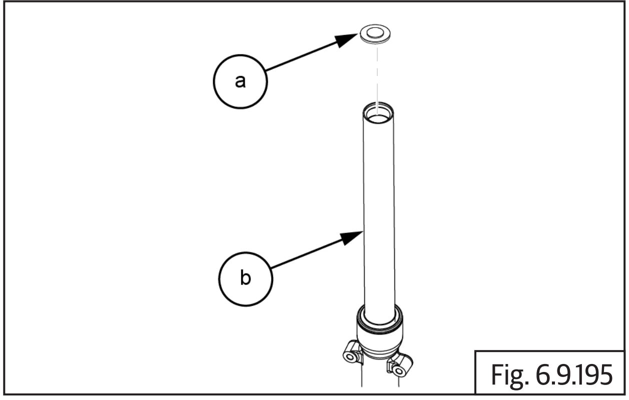


Fig. 6.9.195

- Assemble fork main tube **(a)** on piston **(b)** with the threads on the main tube inner facing downwards. Ensure the piston is guided out of the main tube.

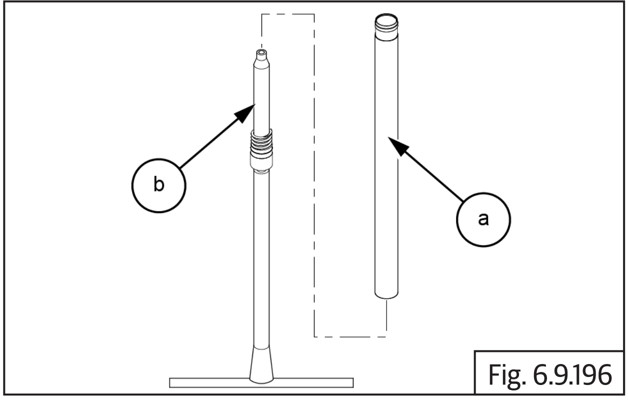


Fig. 6.9.196

SPL	Part No: ST26461-2
	Part Name: Fork damper tube holder

- Assemble taper oil lock **(a)** on piston **(b)**. Apply little grease to lock on its place.

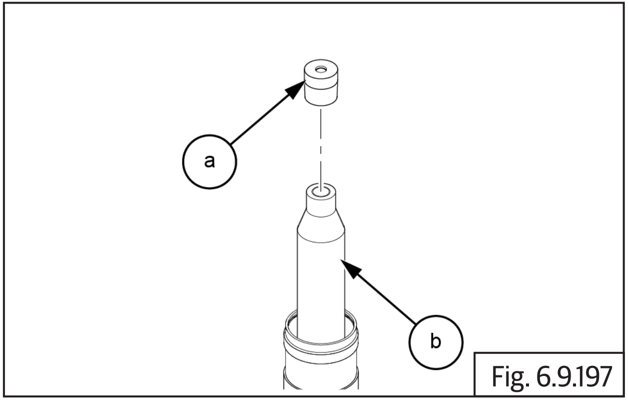


Fig. 6.9.197

- Assemble bottom tube top **(a)** over main tube **(b)**. Ensure it is seated on taper oil lock.

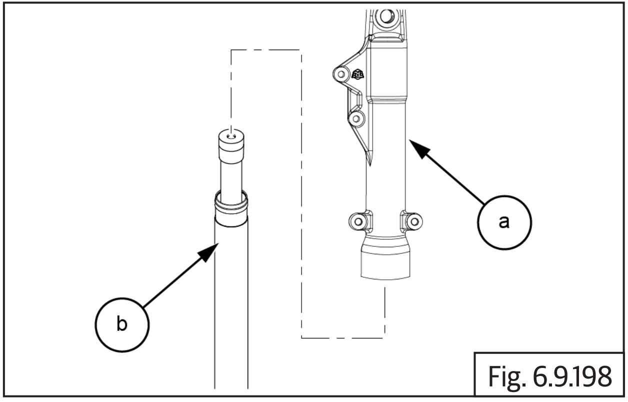


Fig. 6.9.198

- Locate hex socket head screw **(M10) (a)** along with washer **(b)** into mounting hole in bottom tube and tighten to torque.

NOTE
• *Pre-coat bolt threads with LOCTITE 243 before assembling.*

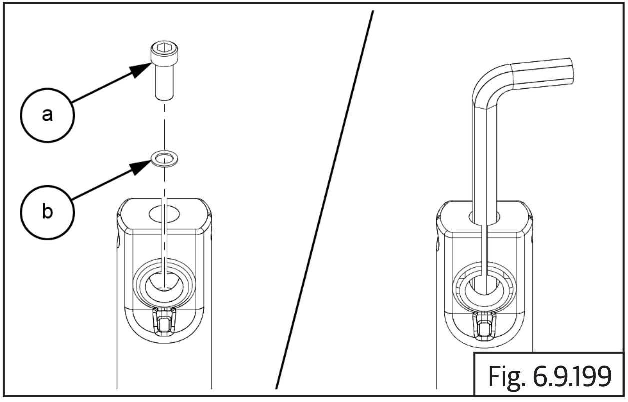


Fig. 6.9.199

🔧	8 mm Allen socket with Ratchet
Torque	15-25 N·m/1.5-2.5 kgf-m

- Remove the special tool.
- Insert washer **(a)** on the main tube **(b)** and ensure proper seating into the bottom tube.

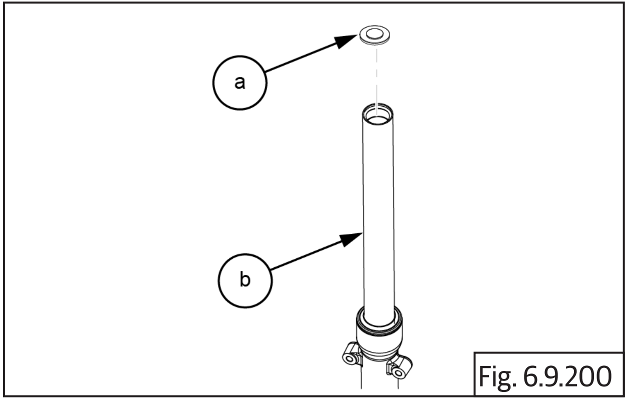


Fig. 6.9.200

- Assemble oil seal **(a)** on main tube **(b)** with the lip facing upwards.

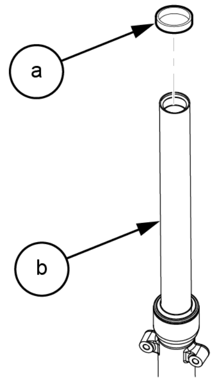


Fig. 6.9.201

- Locate special tool **(a)** on main tube and drive oil seal into bottom tube till it is seated fully and the seal clip groove in bottom tube is visible.

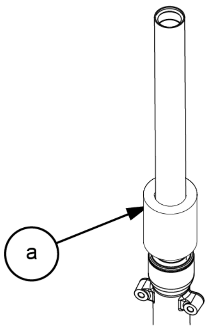
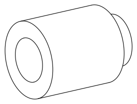


Fig. 6.9.202

SPL 	Part No: ST26485-3
	Part Name: Fork oil seal installer

- Remove special tool from fork inner tube.
- Assemble seal clip **(a)** over oil seal and ensure it is seated properly on the grove in bottom tube.

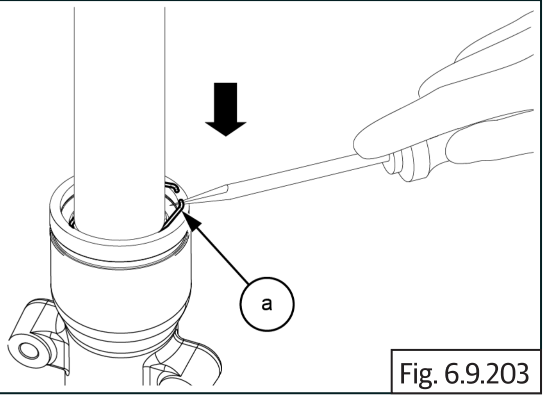


Fig. 6.9.203

- Assemble dust seal **(a)** from main tube top with closed ends upwards. Using special tool, drive dust seal into bottom tube till it is flush with top surface of bottom tube.

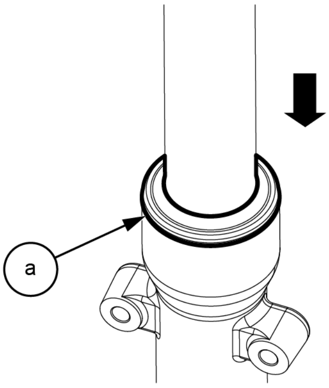
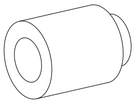


Fig. 6.9.204

SPL 	Part No: ST26485-3
	Part Name: Fork oil seal installer

- Ensure free up and down movement of the main tube into bottom tube.
- Holding bottom tube, gently pull out main tube to its maximum stop ends position.
- Insert spring **(a)** into main tube with its closed coils facing downwards.

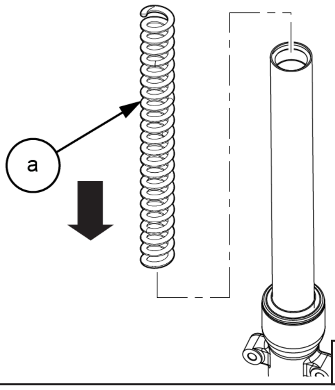


Fig. 6.9.205

- Fill recommended fork oil into main tube.

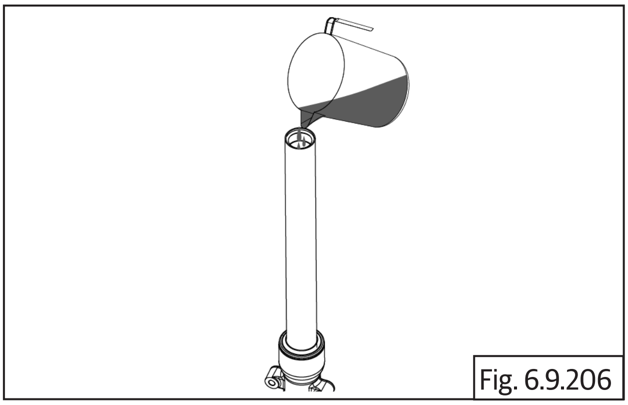


Fig. 6.9.206

Quantity:	453 ml/fork
Oil grade:	2w25

- Replace with new oil whenever the oil drained from fork.
- Check oil quantity and fill with recommended fork oil with specified grade. Specified oil grade: 10Wt (Fork Oil Quantity = 453 ml per fork).
- Insert steel plate **(a)** into main tube over spring top.

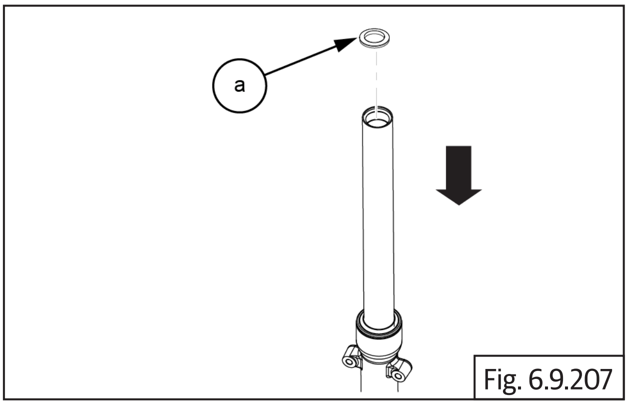


Fig. 6.9.207

- Assemble spacer tube **(a)** into main tube.

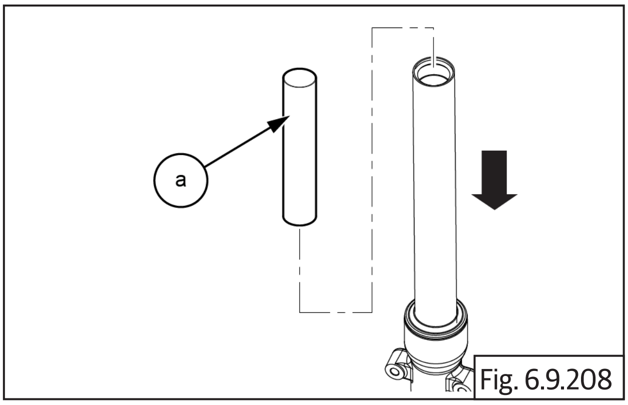


Fig. 6.9.208

- Assemble plain washer **(a)** over spacer tube.

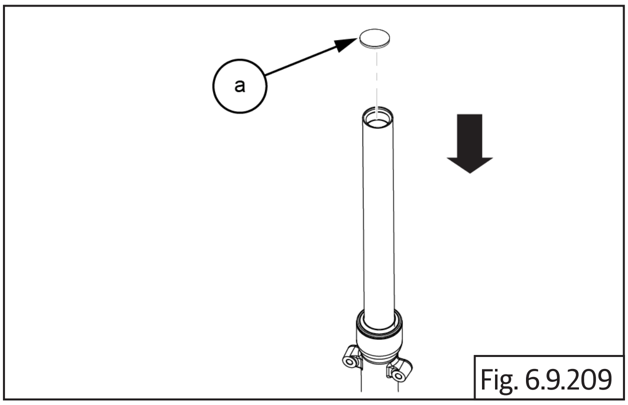


Fig. 6.9.209

- Locate O-ring **(a)** on cap nut **(b)**, position it over washer correctly, gently push down cap nut till threads engage in main tube **(c)** and tighten fully.

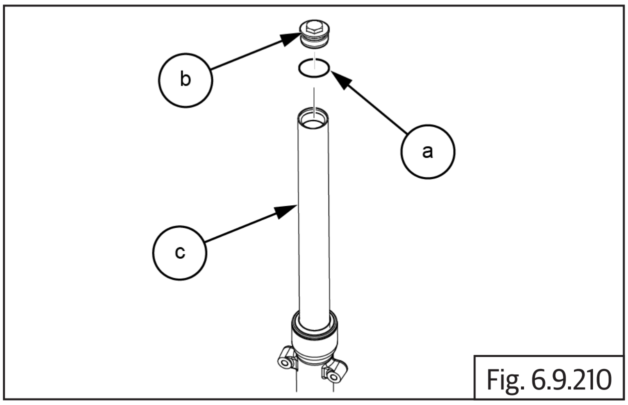


Fig. 6.9.210

🔧	36 mm Ring spanner
Torque	25-30 N-m/2.5-3.0 kgf-m

⚠ CAUTION

Ensure thread are engaged correctly to prevent damage to cap nut/main tube threads

6.9.20. Front Fork LH and RH Assembly on Motorcycle

- Ensure pinch bolts on LH and RH sides of the steering stem and top yoke are sufficiently loose.
- Ensure the steering stem and top yoke fork mounting holes are aligned.
- Position headlamp holder RH between steering stem and top yoke.

- Insert fork assembly RH **(a)** into steering stem **(b)**, headlamp holder, handlebar clip on and top yoke.

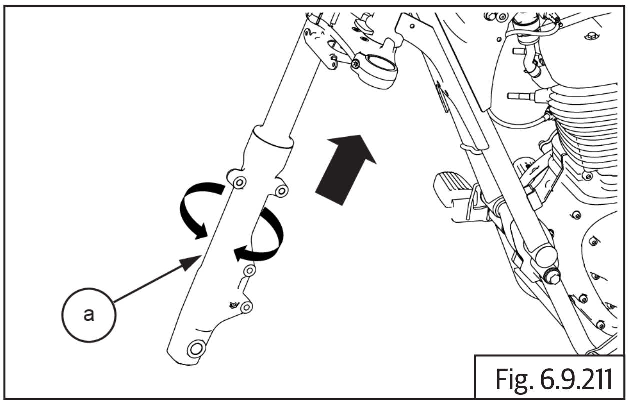


Fig. 6.9.211

- Gently tighten the top pinch bolt in steering stem RH to prevent fork from dropping down.
- Repeat above process to assemble fork assembly LH.
- Ensure fork assembly RH and LH top is **10 mm** above and hex cap nut is above the top yoke.

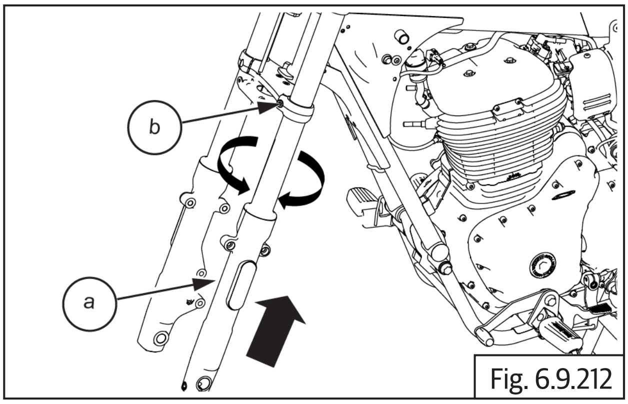


Fig. 6.9.212

- Tighten pinch bolt **(a)** on bottom yoke.

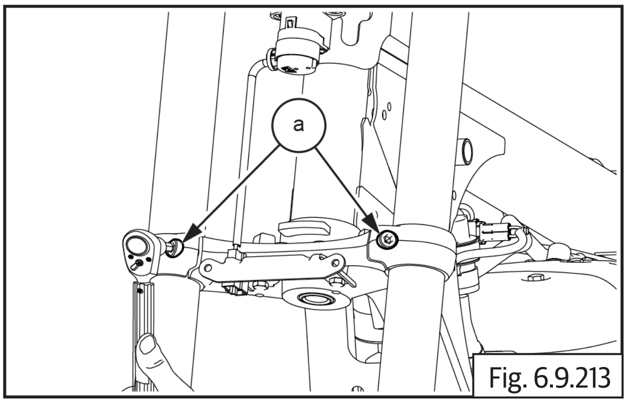


Fig. 6.9.213

🔧	6 mm Allen socket with Ratchet
Torque	21-29 N-m/2.1-2.9 kgf-m

- Reassemble the following parts:
  - Assemble Ignition switch and connect wiring connector (section 11.12.2).
  - Instrument cluster and connect wiring connector (section 11.12.5).
  - Trafficators LH and RH and connect wiring coupler (section 11.9.1).
  - Headlamp assembly (section 11.12.1).
  - Headlamp housing between headlamp holder LH and RH (section 11.12.4).
  - Front number plate - India (section 6.6.16).
  - Front mudguard (section 6.6.15).
  - Wheel caliper on fork end LH (section 9.2.8).
  - ABS wheel speed sensor on fork end LH (section 9.3.9).
- Position brake hose and ABS wheel speed sensor in the clamps on the LH side.
- Locate wheel speed sensor on RH side of the wheel hub, position front wheel between fork ends, ensure speed sensor is correctly positioned against fork end RH. Insert front wheel axle into fork end and tighten to torque (section 6.8.13).
- Support motorcycle underneath cradle frame such that front wheel is off the ground by minimum 6 inches/15 cm.

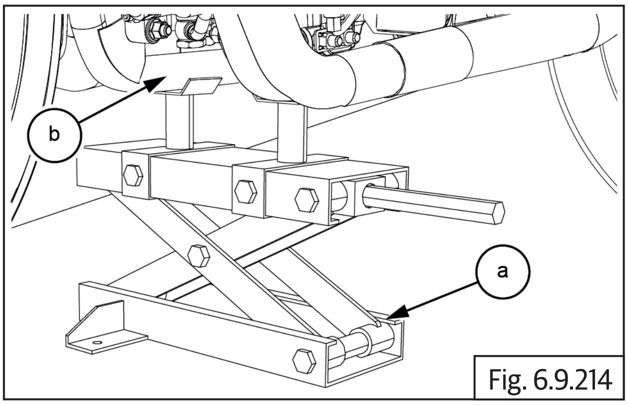


Fig. 6.9.214

- Turn handlebar to extreme left and right position and check for free and smooth rotation.
- Hold the front wheel straight ahead, check for any play.
- Gently push front wheel upwards and release, check for any play.
- Tighten top nut **(a)** on top yoke to torque.

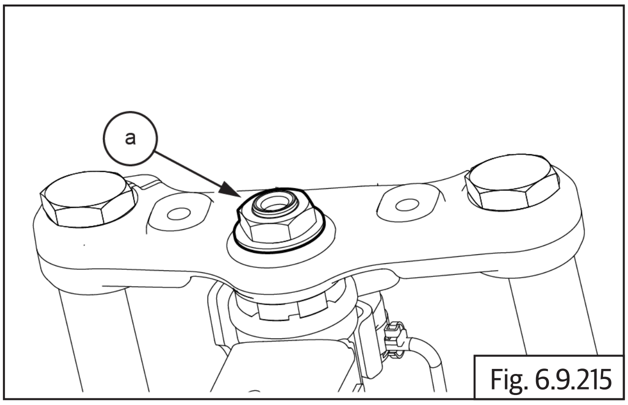


Fig. 6.9.215

🔧	30 mm Hex socket with Ratchet
Torque	50-60 N-m/5.0-6.0 kgf-m

6.9.21. Steering Stem Play Adjustment

- Ensure the motorcycle is on a firm and flat surface.
- Ensure front wheel is off the ground. Turn handlebar to extreme LH and RH side to check for free movement. Hold handlebar in straight position and gently lock the motorcycle keeping a finger underneath top yoke to check for any axial or lateral movement.
- If movement is found adjust as follows:
- Loosen top nut **(a)** on top yoke.

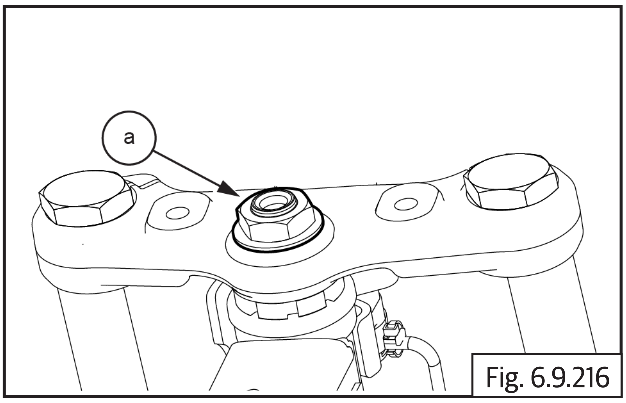


Fig. 6.9.216

🔧	30 mm Allen socket with Ratchet

- Loosen 2 Nos. Pinch bolts **(M8) (a)** on top yoke LH and RH side (fork main tube area).

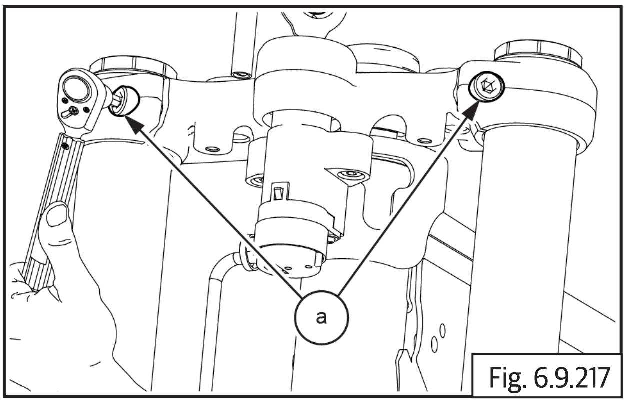


Fig. 6.9.217

🔧	6 mm Allen socket with Ratchet

- Locate stem nut **(a)** and tighten gently.

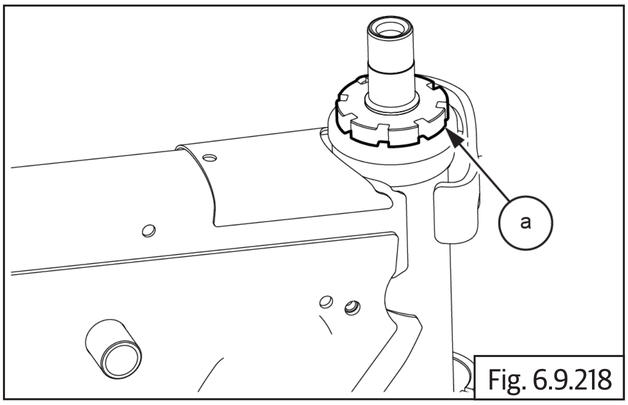


Fig. 6.9.218

NOTE

- *After a set torque of 8 N-m do not steer the motorcycle.*

- Check for free rotation and no axial or lateral movements.
- Tighten pinch bolt on top yoke and stem nut.
- Tighten 2 Nos. **(a)** pinch bolts to specified torque 20 N-m/2.0 kgf-m.

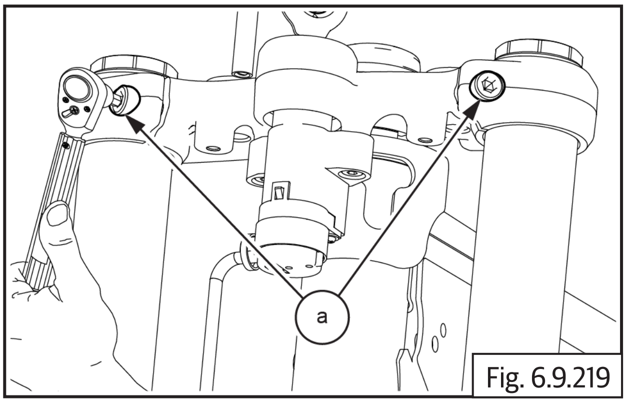


Fig. 6.9.219

🔧	6 mm Allen socket with Ratchet

- TIghten top nut **(a)** on top yoke.

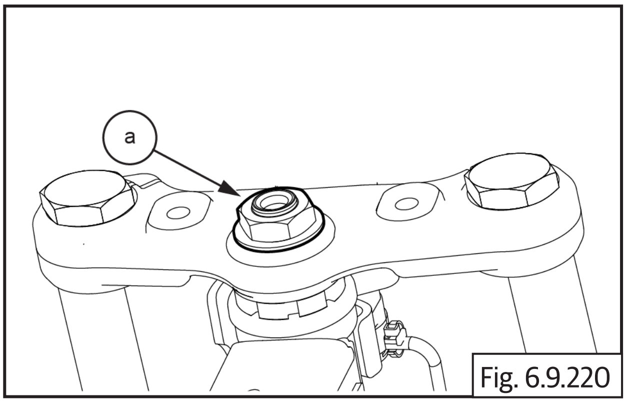


Fig. 6.9.220

🔧	27 mm Allen socket with Ratchet
Torque	32-38 N-m/3.2-3.8 kgf-m

- Locate protective boot **(a)** on top yoke nut.

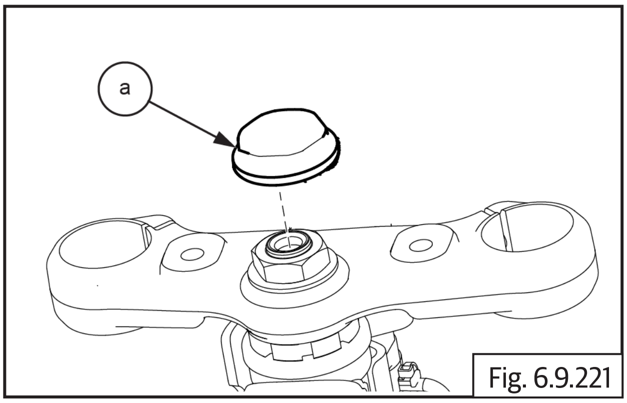


Fig. 6.9.221

Troubleshooting

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
1. Front Fork/Steering Stem Related				
Oil leak from fork assembly LH/RH	Excessive oil is filled.	Excessive oil is filled in fork legs.	Dismantle fork legs, drain oil and fill correct recommended oil quantity.	Royal Enfield front fork oil 2W 25. Quantity 453 ml/ fork.
	Oil leaks from top cap nut.	Cap nuts are loose/sealing washer is damaged.	Tighten Cap nuts/replace sealing washer.	
	Oil leaks between main tube and guide tube is faulty.	Oil seals are worn-out or not seated evenly/loose in guide tubes.	Dismantle fork legs and replace oil seals.	
	Oil leaks from guide tube bottom.	Oil leaks from Hex socket bolt at the bottom of guide tube.	Dismantle fork legs and replace sealing washer bottom and reassemble.	
Hitting noise from front fork/s	Oil quantity is less in one/both fork legs.	Oil quantity mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 453 ml/ fork.
	Fork main springs have become soft/ coils are broken/ length is reduced.	Fork main springs have lost tension/Overall length of the main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 390 ± 4.0mm.
	Rebound spring has become soft/broken/ length is reduced.	Rebound springs have lost tension/overall length is reduced/coils are broken.	Dismantle fork legs and replace rebound springs.	
	Taper oil lock is not seated properly/is loose on piston tube.	Taper oil lock is seated unevenly/loose in piston tube/hex socket bolt at fork end bottom is loose.	Dismantle fork leg assemblies, check for uneven seating/loose fittings and replace taper oil lock/fork piston assembly.	
Fork action is soft	Oil quantity is less in one/both fork legs.	Oil quantity mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain out oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 453 ml/ fork.
	Fork main springs are soft/coils are broken/ length is reduced.	Fork main springs have lost tension/overall length of main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 390 ± 3.0mm.

Symptom	**Possible Cause**	**Diagnosis**	**How to Fix**	**Recommended Specification**
Fork action is hard	Excessive oil is filled in fork assembly LH/ RH.	Excessive oil is filled in the fork legs.	Dismantle fork legs, drain oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 453 ml/ fork.
	Fork main tube movement in fork ends is sticky.	Fork main tube is bent.	Dismantle fork legs, check main tube for straightness and replace main tubes.	
		Fork end tubes are damaged.	Dismantle fork legs, check fork ends inside for excessive wear-out.	
Riding is unstable	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reassemble correctly.	
	Wheel rims are out of trueness.	Wheel rims are bent/have excessive run-out.	Remove tyre and true the wheel rim correctly.	
	Wheel rims have a crack/heavy damage.	Wheel rims have been cracked/damaged due to impact.	Replace with Royal Enfield genuine wheel rims.	
	Wheels have excessive axial/side play.	Wheel bearings are worn-out	Remove bearing and replace	
	Hubs front/rear are cracked/damaged	Wheel hubs are damaged due to impact.	Replace with Royal Enfield genuine hubs.	
	Oil quantity is mismatching in LH and RH fork legs.	Oil quantity mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 453 ml/ fork.
	Fork main springs have become soft/ coils are broken/ length is reduced.	Fork main springs have lost tension/Overall length of the main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 390 ± 4.0mm.
	Fork main tube movement in fork end is sticky.	Fork main tube is bent.	Dismantle fork legs, check main tube for straightness and replace main tubes.	
		Fork end tubes are damaged.	Dismantle fork legs, check fork ends inside for excessive wear-out and replace.	
	Steering stem movement is not smooth.	Control cables/wiring harness is not routed properly.	Route the control cables/ wiring harness correctly and strap to frame.	
		Steering stem nut is excessively tightened.	Adjust the steering stem nut correctly.	
		Steering stem bearings rollers have sticky movement/is rusted/bearing is damaged/uneven seating.	Dismantle steering stem and replace bearings.	
	Steering stem is bent.	Steering stem is bent.	Replace steering stem.	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Vehicle is pulling to one side	Tyre pressures are less/more than recommended.	Front and rear tyre pressures are under/over inflated.	Ensure correct tyre pressures.	**Solo:** Front tyre: 32 psi/2.2 kg/cm^2. Rear tyre: 32 psi/2.2 kg/cm^2. **With Pillion:** Front tyre: 32 psi/2.2 kg/cm^2. Rear Tyre: 36psi/2.53 kg/cm^2.
	Wheels alignment is not proper.	Front and rear wheels are not aligned.	Align front and rear wheels correctly.	
	Oil quantity is mismatching in LH and RH fork legs.	Oil quantity is mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain out the oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 453 ml/ fork.
	Fork main springs have become soft/ coils are broken/ length is reduced.	Fork main springs have lost tension/Overall length of the main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 390 ± 4.0mm.
	Steering movement is hard.	Steering stem nut is excessively tightened.	Adjust steering stem nut correctly.	
		Steering stem bearings rollers have sticky movement/are rusted/ bearing is damaged/uneven seating.	Dismantle steering stem and replace bearings.	
	Vehicle met with an accident.	Fork main tube is bent.	Dismantle fork legs, check main tube for straightness and replace main tubes.	
		Fork end tubes are damaged.	Dismantle fork legs, check fork ends inside for excessive wear-out and replace.	
		Steering stem is bent.	Replace steering stem	
		Main frame is bent.	Check main frame for impact/bends and replace.	
2. REAR SHOCK ABSORBER/SWINGARM RELATED				
Rear suspension is noisy	Rear shock absorbers bushes are worn-out/ damaged.	Shock absorbers have excessive radial/axial play on top/bottom mounting bolts due to bush damage.	Replace both shock absorbers as a set.	
	Rear shock absorbers are misaligned.	Top/bottom mounting locations of shock absorbers are misaligned.	Check top and bottom mounting points for any misalignment. Replace swingarm if it is bent.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are rusted/jammed.	Replace swingarm bushes and axle.	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Rear suspension is too soft	Shock absorber spring is preloaded at Min position.	Rear shock absorber spring preload is adjusted to soft position.	Adjust shock absorber spring preload evenly on both LH and RH side for the desired riding comfort and road conditions.	
	Shock absorbers are weak.	Rear shock absorbers have oil leakage/springs are very soft.	Replace both shock absorbers as a set.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are worn-out.	Replace swingarm bushes and axle.	
Rear suspension is too hard	Shock absorbers spring is preloaded at Max position.	Rear shock absorbers spring preload is adjusted to maximum hard position.	Adjust shock absorber spring preload evenly on both LH and RH side for desired riding comfort and road conditions.	
	Shock absorbers are defective.	Rear shock absorbers compression is very hard.	Replace both shock absorbers as a set.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are rusted/jammed .	Replace swingarm bushes and axle.	
Rear tyre worn-out on one side	Rear shock absorbers spring preload adjustment is mismatching between LH and RH shock absorbers.	Spring preload adjustments are not at same position on LH & RH shock absorbers.	Adjust shock absorber spring preload evenly on both LH and RH side for desired riding comfort and road conditions.	
	Rear wheel bearings are defective.	Rear wheel bearings are worn-out/have excessive side play.	Replace wheel bearings.	
	Rear swingarm is defective.	Rear swingarm is bent (LH & RH arms not at same level).	Replace swingarm assembly.	
Vehicle skids when rear brake is applied	Wheels alignment is not proper.	Front and rear wheels are not aligned.	Align front and rear wheels.	
	Rear wheel bearings are defective.	Rear wheel bearings are worn-out/have excessive side play.	Replace wheel bearings.	
	Rear shock absorbers spring preload adjustment is mismatching between LH and RH shock absorbers.	Spring preload adjustments are not at same position on LH & RH shock absorbers.	Adjust shock absorber spring preload evenly on both LH and RH side for desired riding comfort and road conditions.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are worn-out.	Replace swingarm bushes and axle.	
	Rear swingarm is defective/rubbing on frame on one side.	Rear swingarm is bent (LH & RH arms are not at same level).	Replace swingarm assembly.	
Rear swingarm has excessive side play	Rear swingarm mounting to frame is loose.	Rear swingarm axle nut is loose.	Check and correct swingarm alignment to frame and tighten swingarm mountings.	
	Rear swingarm bushes are defective	Rear swingarm bushes are rusted/jammed.	Replace swingarm bushes and axle.	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
3. TYRES RELATED				
Rear tyre is worn-out on one side.	Improper wheel alignment.	Rear wheel is misaligned with respect to front wheel.	Check and correct wheel alignment.	
Tyre wearing out unevenly/ vehicle is unstable/ wobbling	Internal defect/poor quality tyre.	Tyres found to have bulges/ cracks in side wall. Threads are separated from the tyre.	Replace with Royal Enfield recommended tyres.	**Front tyre: 100/90-19** **Rear tyre: 140/70-17**
	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reassemble correctly.	
	Wheel rims have a defect.	Wheel rims are bent/have excessive run-out.	Remove tyre. Carry out proper wheel truing.	
	Rims have excessive side play.	Wheel bearings are worn-out/have excessive play.	Remove and replace wheel bearings.	
4. WHEEL RIMS RELATED				
Vehicle is unstable/ wobbling	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reassemble correctly.	
	Wheel rims are out of trueness.	Wheel rims are bent/have excessive run-out.	Remove tyre and true the wheel rim correctly.	
	Wheel rims have a crack/heavy damage.	Wheel rims are cracked/ damaged due to impact.	Replace with Royal Enfield genuine wheel rims.	
	Wheels have excessive axial/side play.	Wheel bearings are worn-out.	Remove bearing and replace.	
	Hubs front/rear are cracked/damaged.	Wheel hubs are damaged due to impact.	Replace with Royal Enfield genuine hubs.	

VEHICLE TROUBLESHOOTING

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6.10. Troubleshooting

6.10.1. Air Filter

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Air induction noise from air filter box is high	Air filter element cover not sealing properly on air filter box assembly	Air filter element cover not seated properly on air filter box assembly/ improperly tightened	Check proper seating of the air filter element cover on air filter box assembly	
	Air filter element cover cracked	Air filter element cover cracked due to improper assembly/over tightened	Replace air filter box assembly	
	Air filter box assembly cracked/damaged	Air filter box assembly not aligned properly and tightened/damaged due to damage	Replace air filter box assembly	
	Hoses connecting to inlet manifold cracked	Cracked due to age hardening/improper assembly	Replace hosesjj	
Engine running very sluggish and pick up poor	Filter element choked	Filter element choked with dirt/water/oil	Check and replace filter element	
Engine misfiring/ running lean/idling improper	Rubber hoses connecting from air filter box assembly to acv, iac, throttle body, cracked/disconnected/ not sealing properly	Check and inspect each hose for no damage/ cracks/proper fitting	Check and replace hose/s, and/or air filter body as required	
	Filter element damaged	Damaged due to mishandling/heavy particles entering air filter box assembly	Check and replace filter element	
	Iat sensor not sealing properly	Iat sensor sealing gasket damaged/mounting screws loose	Check and replace iat sensor gasket/sensor	
	Acv not sealing properly	Acv sealing gasket damaged/mounting screws loose	Check and replace acv gasket/sensor	
Engine oil accumulation inside air filter box assembly	Excessive oil in sump	Check and maintain correct engine oil level	Clean breather chamber and hose leading to air filter box assembly	

6.10.2. Control Cables

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Clutch lever movement not smooth	Clutch lever operation at is sticky	Clutch lever, bracket and pivot screw at handlebar end is dry without lubrication/excessive dirt accumulation	Clean and lubricate clutch lever, bracket and pivot screw at handlebar end	
	Clutch lever excessive movement in handlebar bracket LH	Clutch lever mounting hole is out of shape/fixing bolt worn-out	Check and replace clutch lever bracket assembly	
	Inner cable movement sticky	Inner cable strands broken and jammed inside outer cable/clutch lever bracket	Check and replace clutch cable	
		Teflon tube inside outer cable torn/damaged	Check and replace clutch cable	
	Clutch shaft movement sticky in cover RH	Poor/no lubrication of the clutch shaft in cover RH/ uneven wear-out of clutch shaft/cover RH	Check and replace clutch shaft/cover RH	
	Clutch plates movement in clutch housing is sticky	Clutch plates/clutch housing damaged	Check and replace clutch plates/clutch assembly	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Clutch operation hard	Clutch lever movement in bracket hard	Clutch lever, bracket and pivot screw at handlebar end is dry without lubrication/excessive dirt accumulation	Clean and lubricate clutch lever, bracket and pivot screw at handlebar end	
	Inner cable movement sticky in outer cable	Inner cable strands broken and jammed inside outer cable/clutch lever bracket	Check and replace clutch cable	
		Teflon tube inside outer cable torn/damaged	Check and replace clutch cable	
	Clutch shaft movement hard in cover RH	Poor/no lubrication of the clutch shaft in cover RH/ uneven wear-out of clutch shaft/cover RH	Check and replace clutch shaft/cover RH	
	Clutch plates burnt and hard	Clutch plates burnt/hard/ clutch housing damaged	Check and replace clutch plates/clutch assembly	
Throttle rotor movement sticky/ opening hard	Throttle cables are stuck between frame and fuel tank	Throttle cables stuck/ jammed between frame and fuel tank	Check cable routing and proper strapping to frame	
	Throttle rotor movement in housing is sticky	Throttle rotor area in the housing is dry/heavy dirt accumulation	Check and lubricate throttle rotor and housing in handlebar	
	Throttle rotor cable seating area damaged	The eyelets in the throttle rotor are damaged/inner cable eyelets not seating correctly in the rotor eyelets	Check and replace throttle cables/throttle rotor	
	Inner cables movement sticky in outer cable	Throttle cables inner strands broken	Check and replace throttle cables	
		Teflon coating in between inner/outer throttle cables damaged		

6.10.3. Handlebar

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Vibrations transmitted to rider while riding	Tyre pressures are more than recommended.	Improper front and rear tyre pressures.	Ensure correct tyre pressures.	**Solo:** Front tyre: 32 psi/2.2 kg/cm^2. Rear tyre: 32 psi/2.2 kg/cm^2. **With Pillion:** Front tyre: 32 psi/2.2 kg/cm^2. Rear Tyre: 36 psi/2.54 kg/cm^2.
	Handlebar balancers are loose.	Balancer mountings are loose/threads are worn-out.	Tighten balancer mountings/replace balancers.	
	Handlebar clamp fasteners are loose on top yoke.	Fasteners loose/ threads worn-out	Check and tighten fasteners/replace fasteners/handlebar clip-ons/top yoke	
	Handlebar is cracked at mounting location.	Clip-on/handlebar clamping locations has minor cracks.	Replace clip-ons/ handlebar	
Uneasiness/pain felt on one shoulder	Handlebar is bent/ misaligned.	One or the other clip-on is bent/ handlebar is bent. Handlebar alignment dots are not correct.	Replace clip-ons/ handlebar. Ensure correct positioning of the handlebar alignment dots with respect to top yoke.	

6.10.4. Exhaust Pipes and Silencers

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Vibration/rattling noise from exhaust pipe/s.	Exhaust pipe mounting to cylinder head is loose.	Exhaust pipe flange mounting to cylinder head is loose/flange is cracked.	Check and tighten flange mounting to torque. Replace exhaust pipe if flange is cracked.	Torque: 25-35 N-m/2.5-3.5 kgf-m
	Exhaust pipe mounting to frame is loose.	Fasteners are loose/ mounting clamps are cracked.	Check and tighten fasteners to torque. Replace clamps if they are cracked.	Torque: 25-35 N-m/2.5-3.5 kgf-m
Vibration/rattling noise from silencer/s.	Silencer mounting to frame is loose.	Fasteners are loose/mounting clamps are cracked.	Check and tighten fasteners to torque Replace clamps/ silencer if they are cracked.	Torque:25-35 N-m/2.5-3.5 kgf-m
	Internal baffles in silencer are broken.	Remove silencer and shake to check if internal baffles are cracked.	Replace silencer assembly.	
Exhaust leak from cylinder head joint/ silencer joint.	Gaskets are burnt/ missing.	Gaskets are burnt-out due to loose clamping of exhaust pipe/ silencer.	Replace exhaust pipe/silencer gasket.	

6.10.5. Wheels

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
1. Tyres Related				
Centre Threads Wear-Out Is High/ Poor Traction/ Unstable Riding	Tyre pressure is more than recommended.	Front and rear tyre pressure is over inflated.	Ensure correct tyre pressures.	Front tyre: 32 psi/2.2 kg/cm^2. Rear tyre: Solo: 32 psi/2.2 kg/cm^2 With Pillion: 36 psi/2.54 kg/cm^2.
Side Threads Wear-Out Is High/Side Wall Has Cracks/ Motorcycle Has Dragging/Unstable Riding	Tyre pressures is less than recommended.	Front and rear tyre pressures under inflated side walls have minute cracks.	Check inner tubes for any puncture/ leaky valve pins ensure correct tyre pressures.	Front tyre: 32 psi/2.2 kg/cm^2. Rear tyre: Solo: 32 psi/2.2 kg/ cm^2. With Pillion: 36 psi/2.54 kg/cm^2.
Rear Tyre Wear-Out On One Side	Improper wheel alignment.	Rear wheel misaligned with respect to front wheel.	Check and correct wheel alignment.	
Tyre/S Wearing Out Is Uneven/ Motorcycle Is Unstable/Wobbling	Internal defect/poor quality tyre.	Tyres found to have bulges/cracks in side wall. Threads are separated from the tyre.	Replace with Royal Enfield recommended tyres.	Front tyre: 100/90-19, Rear tyre: 140/70-17,
	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reset correctly.	
	Wheel rims have a defect.	Wheel rims are bent/ have excessive run-out.	Remove tyre and carry out proper wheel truing.	
	Rims have excessive side play.	Wheel bearings worn-out/excessive play.	Remove and replace wheel bearings.	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
2. Wheel Rims Related				
Motorcycle Is unstable/Wobbling	Tyre seating on rims is improper	Tyre bead is uneven at the rim surface	Remove tyre and reset correctly	
	Wheel rims are out of trueness	Wheel rims are bent/ have excessive run-out	Remove tyre and true the wheel rim correctly	
	Wheel rims have a crack/heavy damage	Wheel rims are cracked/damaged due to impact	Replace with royal enfield genuine wheel rims	
3. Others				
Motorcycle Is unstable/Wobbling	Wheels have excessive axial/side play	Wheel bearings are worn-out	Remove bearing and replace	

6.10.6. Suspension

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
1. Front Fork/Steering Stem Related				
Oil leak from fork assembly LH/RH	Excessive oil is filled.	Excessive oil is filled in fork legs.	Dismantle fork legs, drain oil and fill correct recommended oil quantity.	Royal Enfield front fork oil 2W 25. Quantity 473 ml/ fork.
	Oil leaks from top cap nut.	Cap nuts are loose/sealing washer is damaged.	Tighten Cap nuts/replace sealing washer.	
	Oil leaks between main tube and guide tube is faulty.	Oil seals are worn-out or not seated evenly/loose in guide tubes.	Dismantle fork legs and replace oil seals.	
	Oil leaks from guide tube bottom.	Oil leaks from Hex socket bolt at the bottom of guide tube.	Dismantle fork legs and replace sealing washer bottom and reassemble.	
Hitting noise from front fork/s	Oil quantity is less in one/both fork legs.	Oil quantity mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 473 ml/ fork.
	Fork main springs have become soft/ coils are broken/ length is reduced.	Fork main springs have lost tension/Overall length of the main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 303 ± 3.0mm.
	Rebound spring has become soft/broken/ length is reduced.	Rebound springs have lost tension/overall length is reduced/coils are broken.	Dismantle fork legs and replace rebound springs.	
	Taper oil lock is not seated properly/is loose on piston tube.	Taper oil lock is seated unevenly/loose in piston tube/hex socket bolt at fork end bottom is loose.	Dismantle fork leg assemblies, check for uneven seating/loose fittings and replace taper oil lock/fork piston assembly.	
Fork action is soft	Oil quantity is less in one/both fork legs.	Oil quantity mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain out oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 473 ml/ fork.
	Fork main springs are soft/coils are broken/ length is reduced.	Fork main springs have lost tension/overall length of main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 303 ± 3.0mm.

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Fork action is hard	Excessive oil is filled in fork assembly LH/RH.	Excessive oil is filled in the fork legs.	Dismantle fork legs, drain oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 473 ml/ fork.
	Fork main tube movement in fork ends is sticky.	Fork main tube is bent.	Dismantle fork legs, check main tube for straightness and replace main tubes.	
		Fork end tubes are damaged.	Dismantle fork legs, check fork ends inside for excessive wear-out.	
Riding is unstable	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reassemble correctly.	
	Wheel rims are out of trueness.	Wheel rims are bent/have excessive run-out.	Remove tyre and true the wheel rim correctly.	
	Wheel rims have a crack/heavy damage.	Wheel rims have been cracked/damaged due to impact.	Replace with Royal Enfield genuine wheel rims.	
	Wheels have excessive axial/side play.	Wheel bearings are worn-out	Remove bearing and replace	
	Hubs front/rear are cracked/damaged	Wheel hubs are damaged due to impact.	Replace with Royal Enfield genuine hubs.	
	Oil quantity is mismatching in LH and RH fork legs.	Oil quantity mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 473 ml/ fork.
	Fork main springs have become soft/ coils are broken/ length is reduced.	Fork main springs have lost tension/Overall length of the main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 303 ± 3.0mm.
	Fork main tube movement in fork end is sticky.	Fork main tube is bent.	Dismantle fork legs, check main tube for straightness and replace main tubes.	
		Fork end tubes are damaged.	Dismantle fork legs, check fork ends inside for excessive wear-out and replace.	
	Steering stem movement is not smooth.	Control cables/wiring harness is not routed properly.	Route the control cables/ wiring harness correctly and strap to frame.	
		Steering stem nut is excessively tightened.	Adjust the steering stem nut correctly.	
		Steering stem bearings rollers have sticky movement/is rusted/bearing is damaged/uneven seating.	Dismantle steering stem and replace bearings.	
	Steering stem is bent.	Steering stem is bent.	Replace steering stem.	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Vehicle is pulling to one side	Tyre pressures are less/more than recommended.	Front and rear tyre pressures are under/over inflated.	Ensure correct tyre pressures.	**Solo:** Front tyre: 32 psi/2.2 kg/cm^2. Rear tyre: 32 psi/2.2 kg/cm^2. **With Pillion:** Front tyre: 32 psi/2.2 kg/cm^2. Rear Tyre: 36 psi/2.54 kg/cm^2.
	Wheels alignment is not proper.	Front and rear wheels are not aligned.	Align front and rear wheels correctly.	
	Oil quantity is mismatching in LH and RH fork legs.	Oil quantity is mismatched between LH and RH fork assemblies.	Dismantle fork legs, drain out the oil and fill with correct recommended quantity.	Royal Enfield front fork oil 2W 25. Quantity 473 ml/ fork.
	Fork main springs have become soft/ coils are broken/ length is reduced.	Fork main springs have lost tension/Overall length of the main springs is reduced/coils are broken.	Dismantle fork legs and replace fork main springs.	Main spring length: 303 ± 3.0mm.
	Steering movement is hard.	Steering stem nut is excessively tightened.	Adjust steering stem nut correctly.	
		Steering stem bearings rollers have sticky movement/are rusted/ bearing is damaged/uneven seating.	Dismantle steering stem and replace bearings.	
	In case of vehicle met with an accident.	Fork main tube is bent.	Dismantle fork legs, check main tube for straightness and replace main tubes.	
		Fork end tubes are damaged.	Dismantle fork legs, check fork ends inside for excessive wear-out and replace.	
		Steering stem is bent.	Replace steering stem	
		Main frame is bent.	Check main frame for impact/bends and replace.	
2. Rear Shock Absorber/Swingarm Related				
Rear suspension is noisy	Rear shock absorbers bushes are worn-out/ damaged.	Shock absorbers have excessive radial/axial play on top/bottom mounting bolts due to bush damage.	Replace both shock absorbers as a set.	
	Rear shock absorbers are misaligned.	Top/bottom mounting locations of shock absorbers are misaligned.	Check top and bottom mounting points for any misalignment. Replace swingarm if it is bent.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are rusted/jammed.	Replace swingarm bushes and axle.	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
Rear suspension is too soft	Shock absorber spring is preloaded at Min position.	Rear shock absorber spring preload is adjusted to soft position.	Adjust shock absorber spring preload evenly on both LH and RH side for the desired riding comfort and road conditions.	
	Shock absorbers are weak.	Rear shock absorbers have oil leakage/springs are very soft.	Replace both shock absorbers as a set.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are worn-out.	Replace swingarm bushes and axle.	
Rear suspension is too hard	Shock absorbers spring is preloaded at Max position.	Rear shock absorbers spring preload is adjusted to maximum hard position.	Adjust shock absorber spring preload evenly on both LH and RH side for desired riding comfort and road conditions.	
	Shock absorbers are defective.	Rear shock absorbers compression is very hard.	Replace both shock absorbers as a set.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are rusted/jammed .	Replace swingarm bushes and axle.	
Rear tyre worn-out on one side	Rear shock absorbers spring preload adjustment is mismatching between LH and RH shock absorbers.	Spring preload adjustments are not at same position on LH & RH sock absorbers.	Adjust shock absorber spring preload evenly on both LH and RH side for desired riding comfort and road conditions.	
	Rear wheel bearings are defective.	Rear wheel bearings are worn-out/have excessive side play.	Replace wheel bearings.	
	Rear swingarm is defective.	Rear swingarm is bent (LH & RH arms not at same level).	Replace swingarm assembly.	
Vehicle skids when rear brake is applied	Wheels alignment is not proper.	Front and rear wheels are not aligned.	Align front and rear wheels.	
	Rear wheel bearings are defective.	Rear wheel bearings are worn-out/have excessive side play.	Replace wheel bearings.	
	Rear shock absorbers spring preload adjustment is mismatching between LH and RH shock absorbers.	Spring preload adjustments are not at same position on LH & RH sock absorbers.	Adjust shock absorber spring preload evenly on both LH and RH side for desired riding comfort and road conditions.	
	Rear swingarm bushes are defective.	Rear swingarm bushes are worn-out.	Replace swingarm bushes and axle.	
	Rear swingarm is defective/rubbing on frame on one side.	Rear swingarm is bent (LH & RH arms are not at same level).	Replace swingarm assembly.	
Rear swingarm has excessive side play	Rear swingarm mounting to frame is loose.	Rear swingarm axle nut is loose.	Check and correct swingarm alignment to frame and tighten swingarm mountings.	
	Rear swingarm bushes are defective	Rear swingarm bushes are rusted/jammed.	Replace swingarm bushes and axle.	

Symptom	Possible Cause	Diagnosis	How to Fix	Recommended Specification
3. Tyres Related				
Rear tyre is worn-out on one side.	Improper wheel alignment.	Rear wheel is misaligned with respect to front wheel.	Check and correct wheel alignment.	
Tyre/s wearing out unevenly/ vehicle is unstable/ wobbling	Internal defect/poor quality tyre.	Tyres found to have bulges/ cracks in side wall. Threads are separated from the tyre.	Replace with Royal Enfield recommended tyres.	**Front tyre:** 100/90-19 **Rear tyre:** 140/70-17
	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reassemble correctly.	
	Wheel rims have a defect.	Wheel rims are bent/have excessive run-out.	Remove tyre. Carry out proper wheel truing.	
	Rims have excessive side play.	Wheel bearings are worn-out/have excessive play.	Remove and replace wheel bearings.	
4. Wheel Rims Related				
Vehicle is unstable/ wobbling	Tyre seating on rims is improper.	Tyre bead is uneven at the rim surface.	Remove tyre and reassemble correctly.	
	Wheel rims are out of trueness.	Wheel rims are bent/have excessive run-out.	Remove tyre and true the wheel rim correctly.	
	Wheel rims have a crack/heavy damage.	Wheel rims are cracked/ damaged due to impact.	Replace with Royal Enfield genuine wheel rims.	
	Wheels have excessive axial/side play.	Wheel bearings are worn-out.	Remove bearing and replace.	
	Hubs front/rear are cracked/damaged.	Wheel hubs are damaged due to impact.	Replace with Royal Enfield genuine Wheels.	

FUEL SYSTEM

Fuel System

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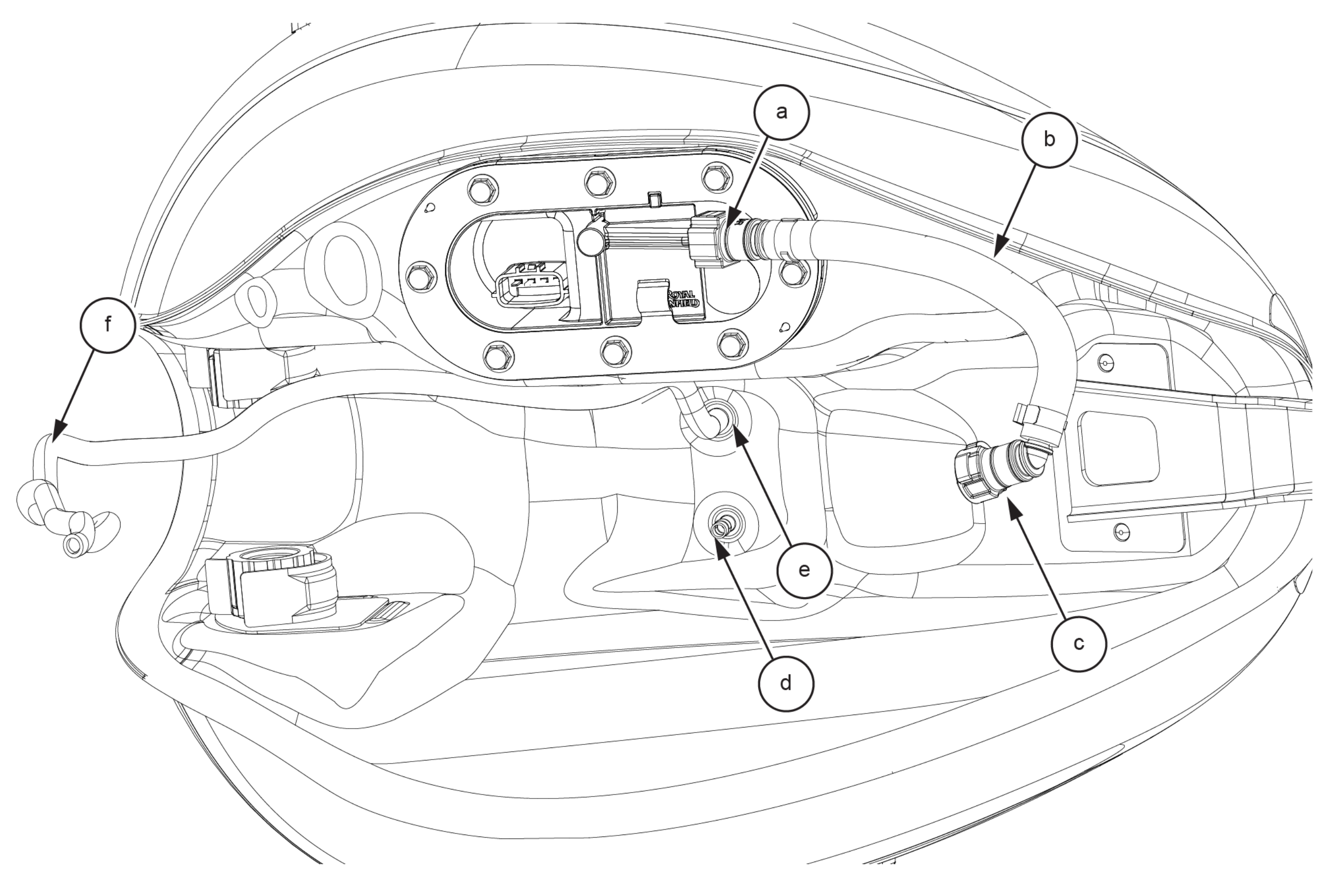
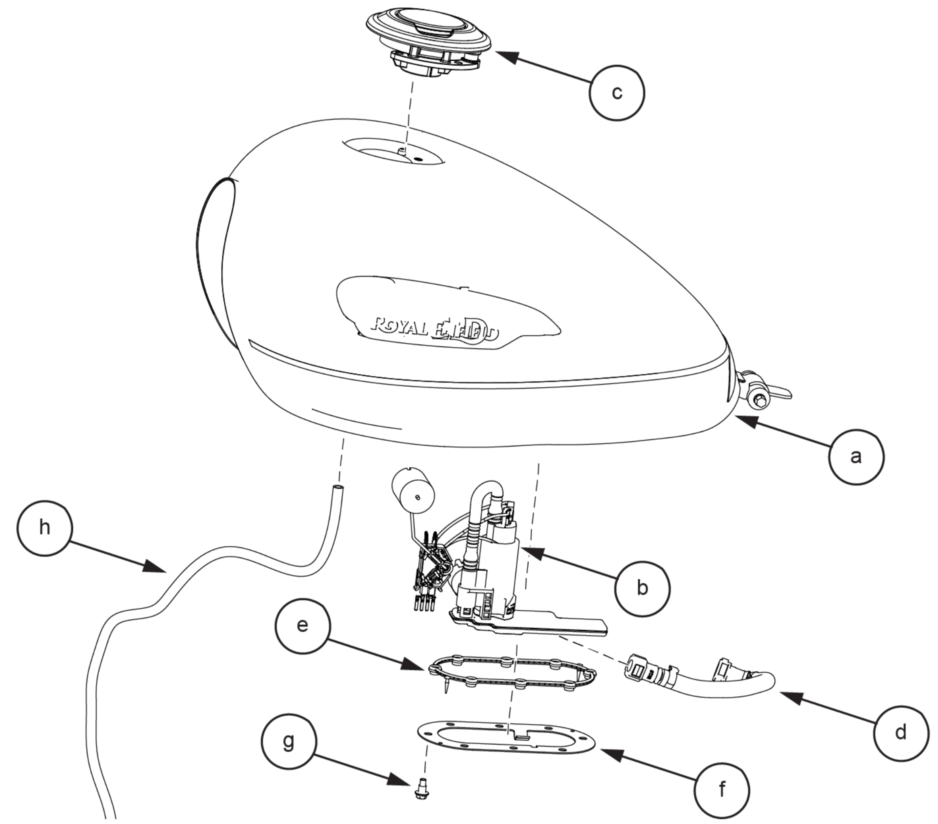
7. Fuel System

General Description

Fuel leaves the tank through fuel pump **(a)** and then passes through the fuel hose **(b)** to injector **(c)**. In case of overfilling excess fuel is drained by a drain hose **(d).** A provision **(e)** is provided to allow evaporated fuel to the EVAP canister end **(f)**.



Fuel System



Item No.	Description	Quantity
a	Fuel Tank	1
b	Fuel Supply Module	1
c	Fuel Cap	1
d	Fuel Hose	1
e	O-Ring, Fuel Supply Module	1
f	Plate, Fuel Pump Module	1
g	Bolt M5	8
h	Drain Hose	1

7.1. Fuel System Components

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Please handle with care. Improper handling can lead to fatal accident or serious injury. Always drain/fill fuel only in a well ventilated area.

Ensure there is no scope for flames or sparks near by while draining/filling fuel.

⚠ CAUTION

Make sure the fuel pressure is relieved before disconnecting the fuel connection.

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

Dismantling

7.1.1. Fuel Tank

- Ensure the ignition and stop switches are in OFF position.
- Remove the fuel tank cap. Drain fuel completely from fuel tank.
- Remove the following parts:
  - Remove side panel RH (section 6.7.1).
  - Remove rider seat (section 6.7.2).
- Loosen and remove 1 Nos. Hex head bolt and nut **(M6) (a)** from rear end of fuel tank on frame **(b)**.

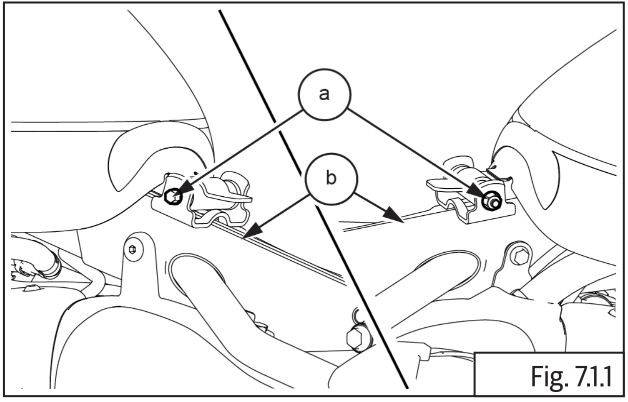


Fig. 7.1.1

🔧	10 mm Socket with Ratchet

7.1.2. Fuel Pump Connector and Fuel Level Sensor

- Gently lift fuel tank **(a)** upwards and pull backwards slightly.
- Disconnect fuel pump connector **(b)** from fuel tank **(a)** and from fuel pump mounting plate hook.

⚠ CAUTION

DO NOT lift the tank too much to prevent damage to connectors and brake hoses.

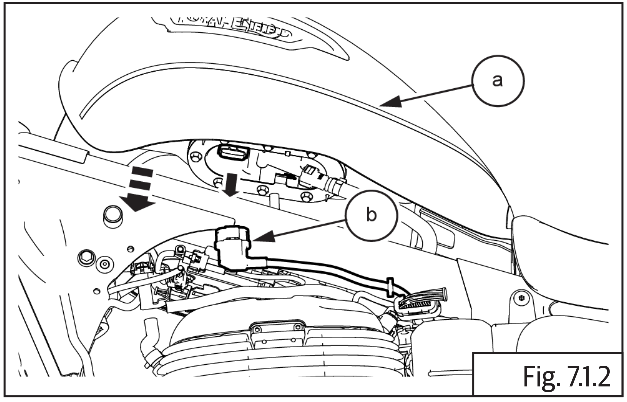


Fig. 7.1.2

7.1.3. Fuel Hose (Fuel Pump to Injector)

- Clean quick fix adapter area and disconnect by pressing lock button **(a)**. Remove fuel hose **(b)**.

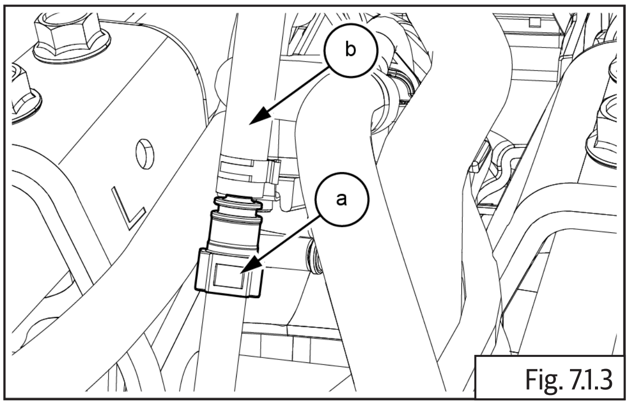


Fig. 7.1.3

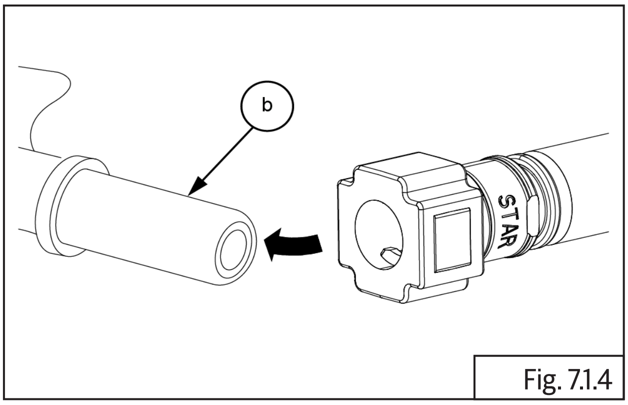


Fig. 7.1.4

7.1.4. EVAP Connections to Fuel Tank

- Disconnect EVAP connection hose **(a)** from fuel tank **(b)**.

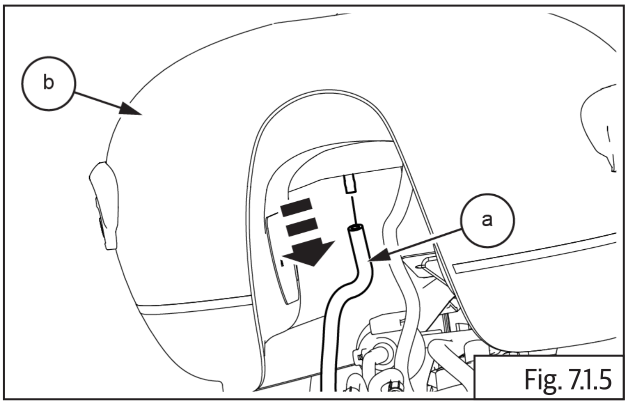


Fig. 7.1.5

7.1.5. Drain Hose

- Disconnect drain hose connection **(a)** from fuel tank **(b)**.

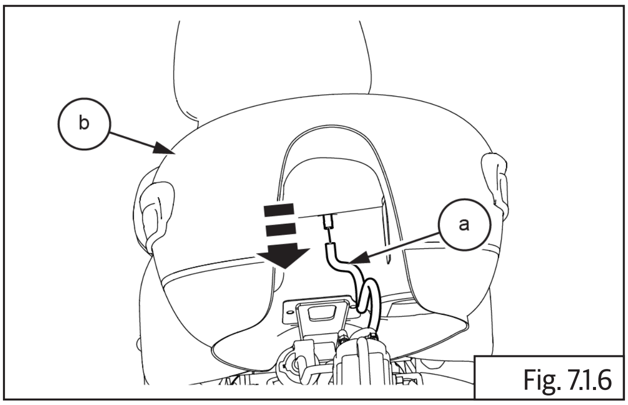


Fig. 7.1.6

- Gently remove fuel tank **(a)** from frame.

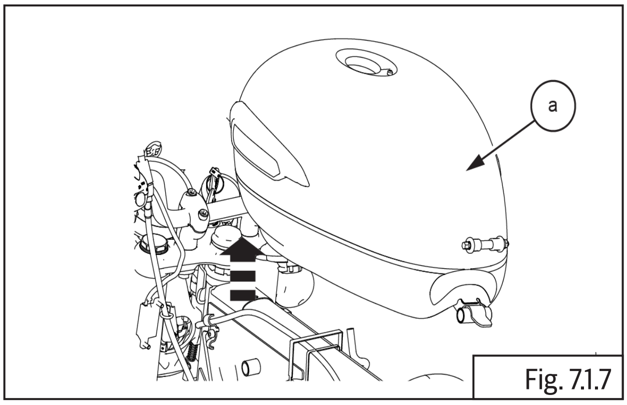


Fig. 7.1.7

7.1.7. Fuel Pump

- Loosen and remove 8 Nos. Hex socket head bolts **(M5) (a)** holding fuel pump **(b)** to tank **(c)**.

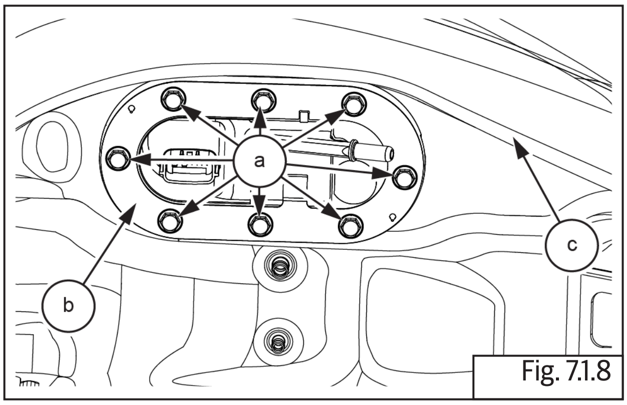


Fig. 7.1.8

🔧	10 mm Socket with Ratchet

- Gently pull out the fuel pump **(a)** from fuel tank **(b)**.

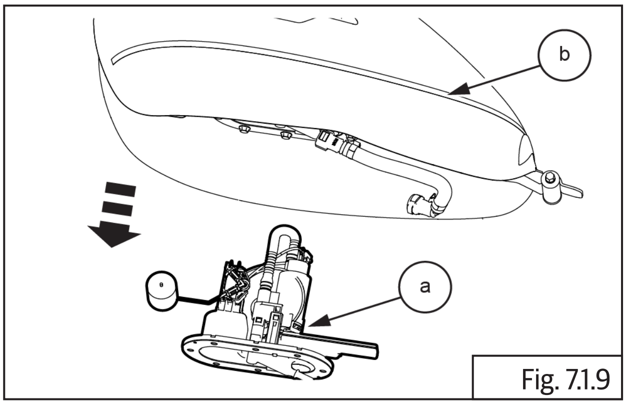
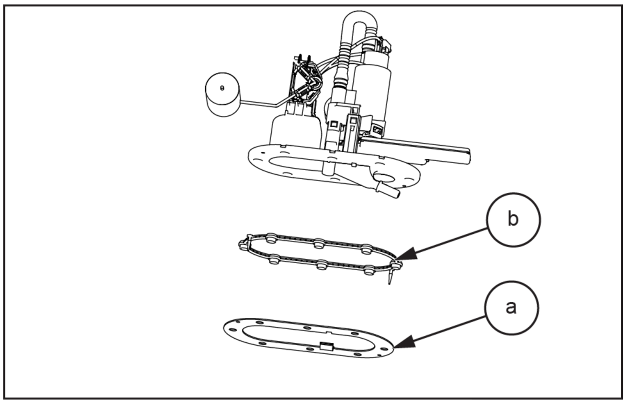


Fig. 7.1.9

- Remove O-rings **(a)** and **(b)** from fuel pump.



7.1.6. Fuel Level Sensor

- Lift connector lock **(a)** and remove the coupler **(b)**.

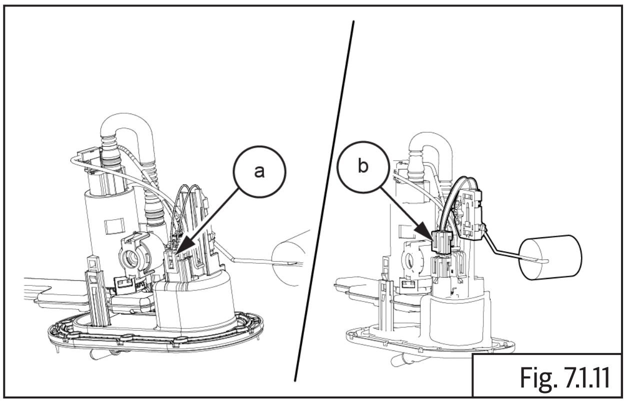


Fig. 7.1.11

- Gently remove the coupler **(a)** from module **(b)**.

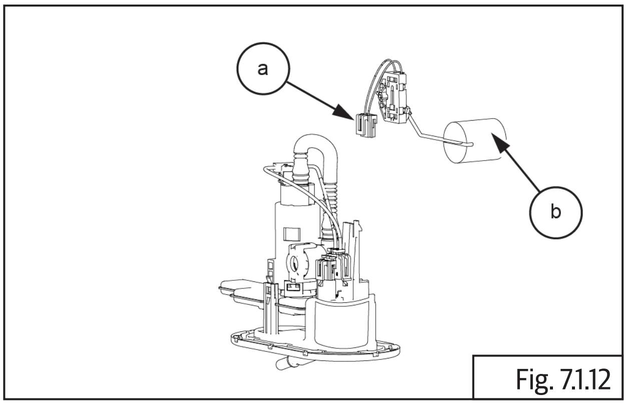


Fig. 7.1.12

- Remove the fuel level sensor **(a)**

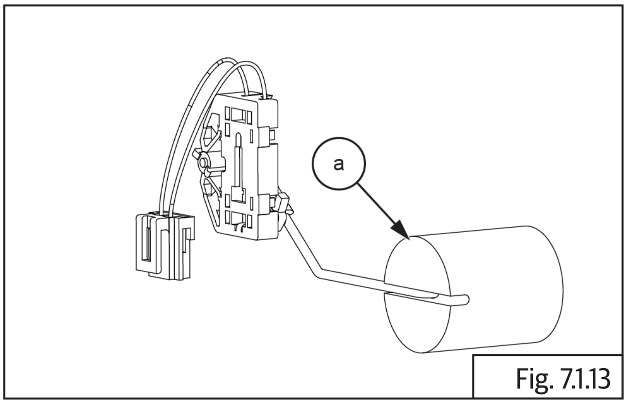


Fig. 7.1.13

7.1.6. Fuel Filter

- Lift stainer lock **(b)** provided in the module **(a)**.

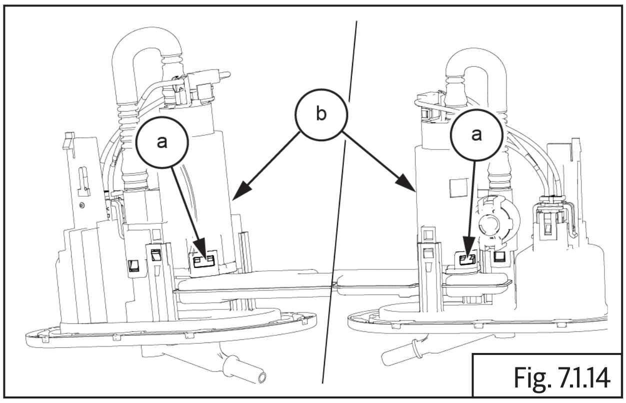


Fig. 7.1.14

- Gently lift the fuel pump **(a)** from fuel pump bracket **(b)**.

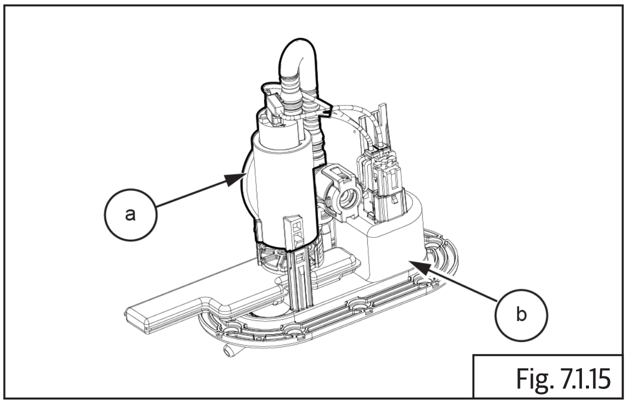


Fig. 7.1.15

- Remove fuel filter **(a)** from fuel pump**(b)**.

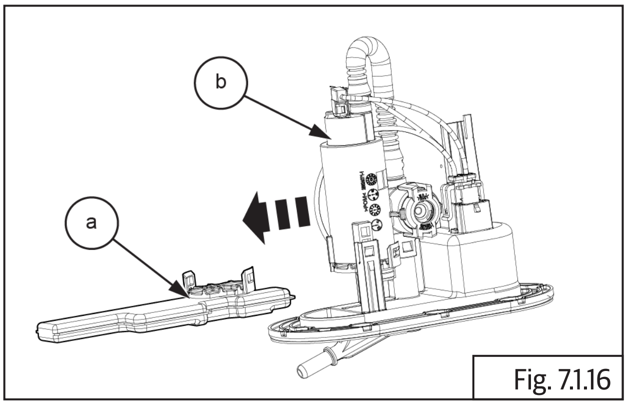


Fig. 7.1.16

⚠ CAUTION

Make sure the dust in the stainer does not enter the fuel pump.

Inspection

7.1.9. Fuel Float

- Check resistance at float unit pins at lower position.
- Check the resistance at float unit pins at higher position.
- Inspect float assembly for fuel ingress. Replace if fuel float assembly is punctured.

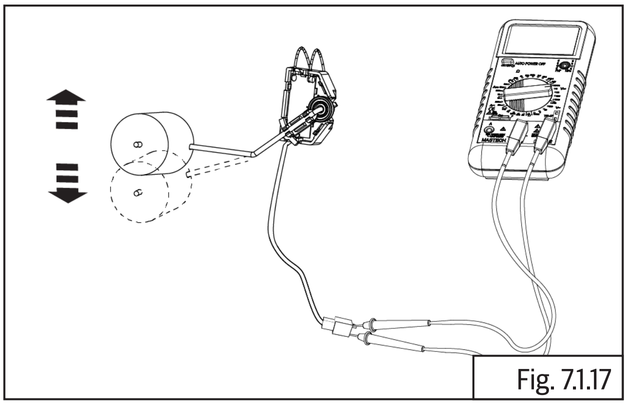


Fig. 7.1.17

7.1.10. Fuel Pump

- Check resistances at fuel pump **(a)** terminals **(b)**. Replace if resistances are out of specifications.

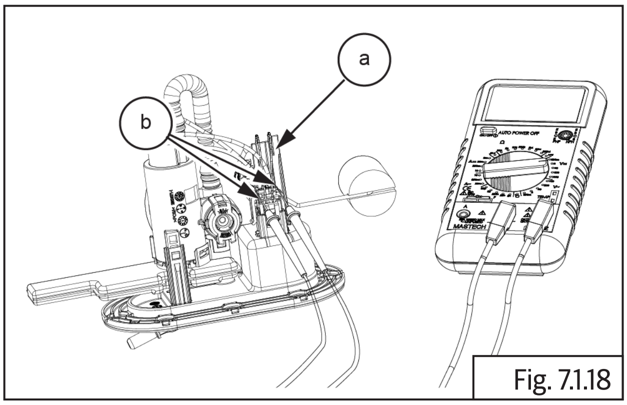


Fig. 7.1.18

7.1.11. Fuel Filter

- Replace fuel filter for every 30,000 Kms.

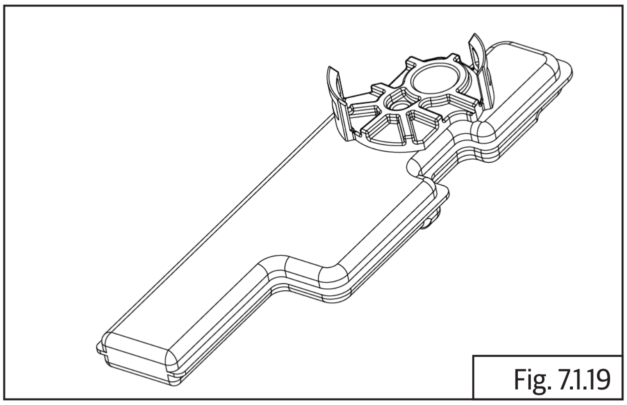


Fig. 7.1.19

- Replace following whenever fuel system is dismantled:
  - O-rings and gaskets
  - Rubber hoses
  - Fuel filters

Assembly

7.1.12 Fuel Filter

- Locate the fuel stainer **(a)** on the sprout **(b)** of the fue pump assembly.

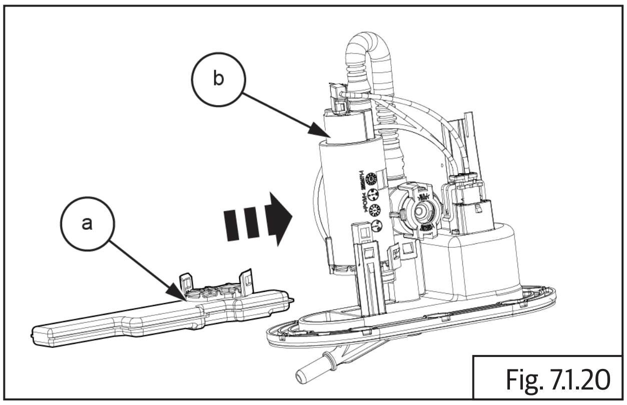


Fig. 7.1.20

- Genly lock the fuel pump **(b)** above the stainer **(a)**.

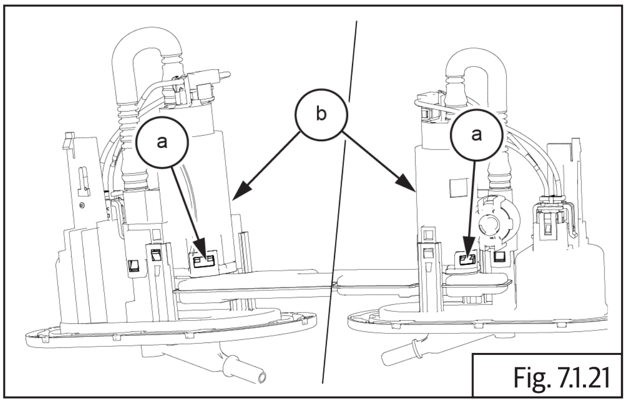


Fig. 7.1.21

- Make sure the stainer is locked properly to the snaps provided in the module.

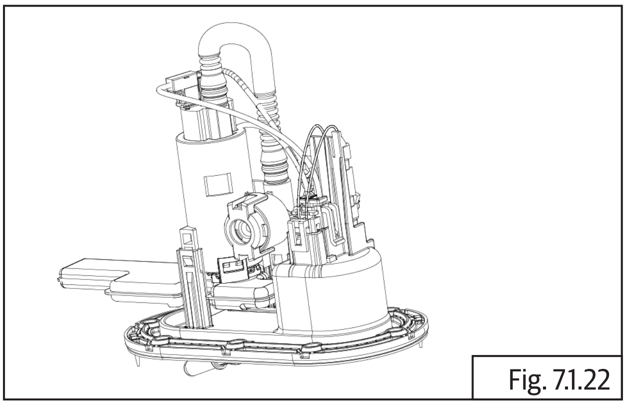


Fig. 7.1.22

⚠ CAUTION

Ensure assembly of new seal every time after dismantling, to prevent leakage.

7.1.13. Fuel Level Sensor

- Align the slot **(a)** with frame key provided in the cover **(b)**.

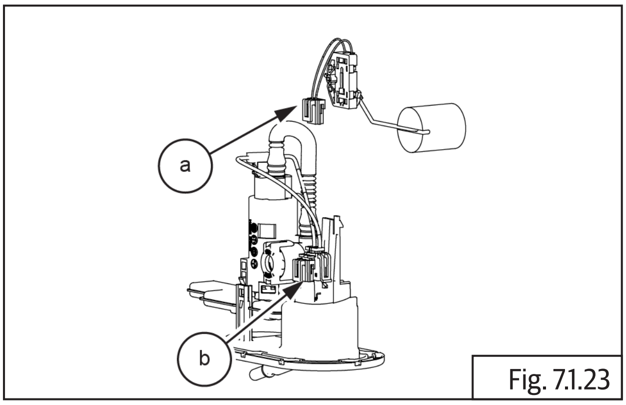


Fig. 7.1.23

- Gently insert the Fuel level sensor **(a)** in the downwards direction till you hear a click sound.

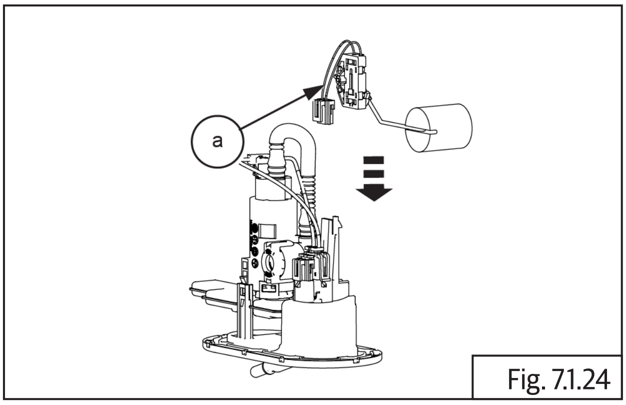


Fig. 7.1.24

- Connect the fuel level sensor coupler **(a)** in the frame **(b)**.

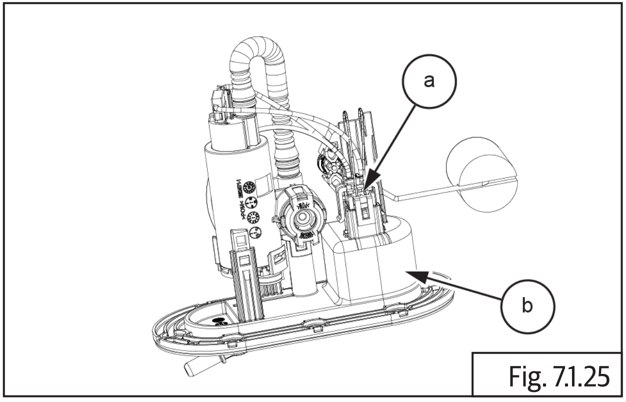


Fig. 7.1.25

⚠ CAUTION
Ensure assembly of new seal every time after dismantling, to prevent leakage.

7.1.14. Fuel Pump

- Locate O-rings **(a)** and **(b)** on fuel pump. Ensure it is seated properly.

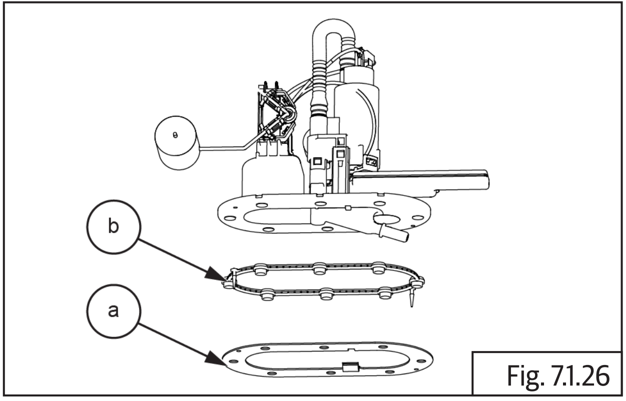


Fig. 7.1.26

- Assemble fuel pump **(a)** into tank **(b)** with outlet pipes facing towards rear of the tank.

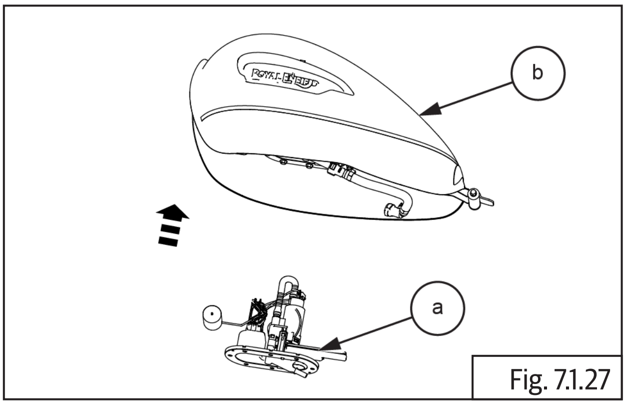


Fig. 7.1.27

- Locate and tighten 8 Nos. Hex socket head bolts **(M5)** **(a)** to assemble fuel pump **(b)** on fuel tank **(c)**.

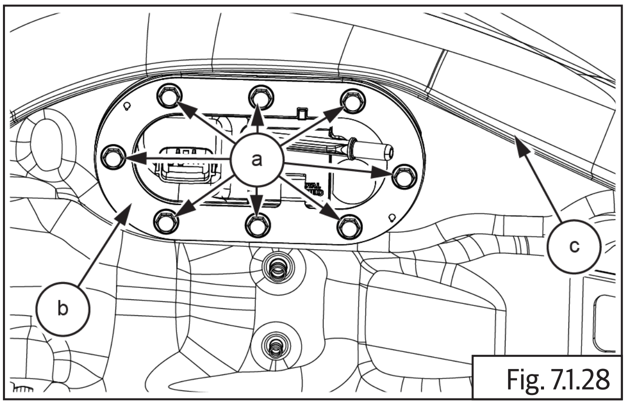


Fig. 7.1.28

🔧	10 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

7.1.15. Fuel Tank

- Hold and slide fuel tank **(a)** into frame guide and ensure bush in fuel tank are aligned into guide in frame.

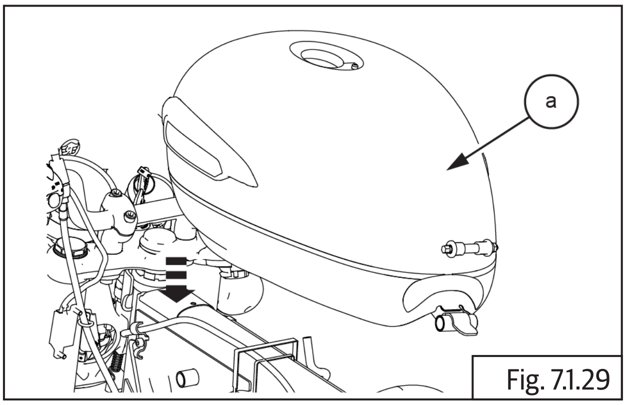


Fig. 7.1.29

7.1.16. Drain Hose

- Gently lift fuel tank and connect drain hose connection **(a)** to fuel tank **(b)**.

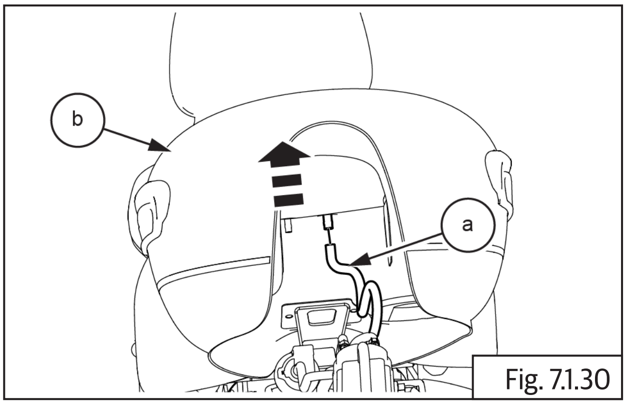


Fig. 7.1.30

7.1.17. EVAP Connections to Fuel Tank

- Connect EVAP connection hose **(a)** to fuel tank **(b)**.

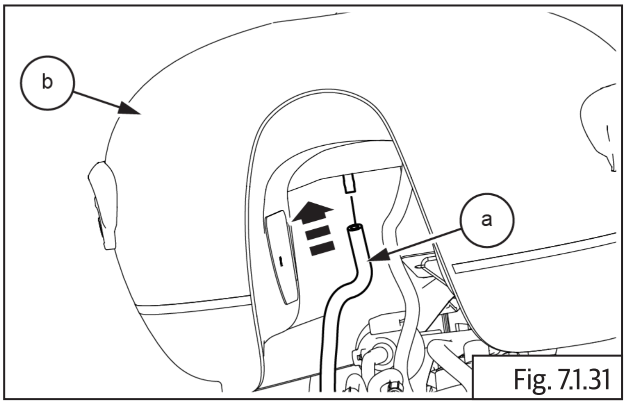


Fig. 7.1.31

7.1.18. Fuel Hose (Fuel Pump to Injector)

- Connect fuel hose **(a)** into quick fix connector **(b)** and ensure lock button is locked with a click sound.

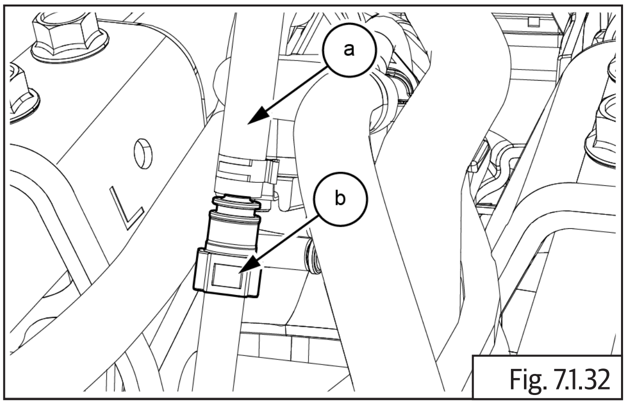


Fig. 7.1.32

7.1.19. Fuel Pump Connector

- Connect fuel pump connector **(a)** into fuel pump **(b)**.

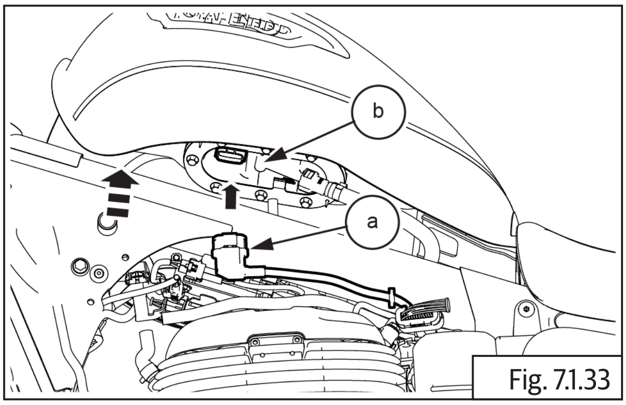


Fig. 7.1.33

- Gently lower the fuel tank into frame.
- Locate and tighten 1 No. Hex head bolts **(M6) (a)** on rear end of fuel tank **(b)**.

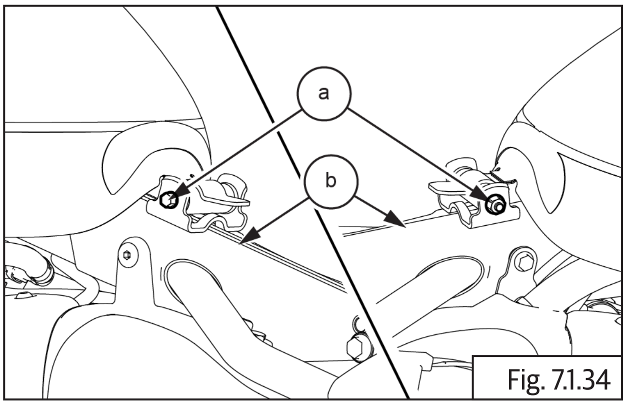


Fig. 7.1.34

🔧	10 mm Socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

NOTE

- *Switch ON and OFF the ignition twice and visually check for any fuel leakage or wet on the tank and components, If anything found, inspect and rectify the issue.*

EVAPORATIVE (EVAP) EMISSION CONTROL SYSTEM

EVAP

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8. Evaporative (EVAP) Emission Control System

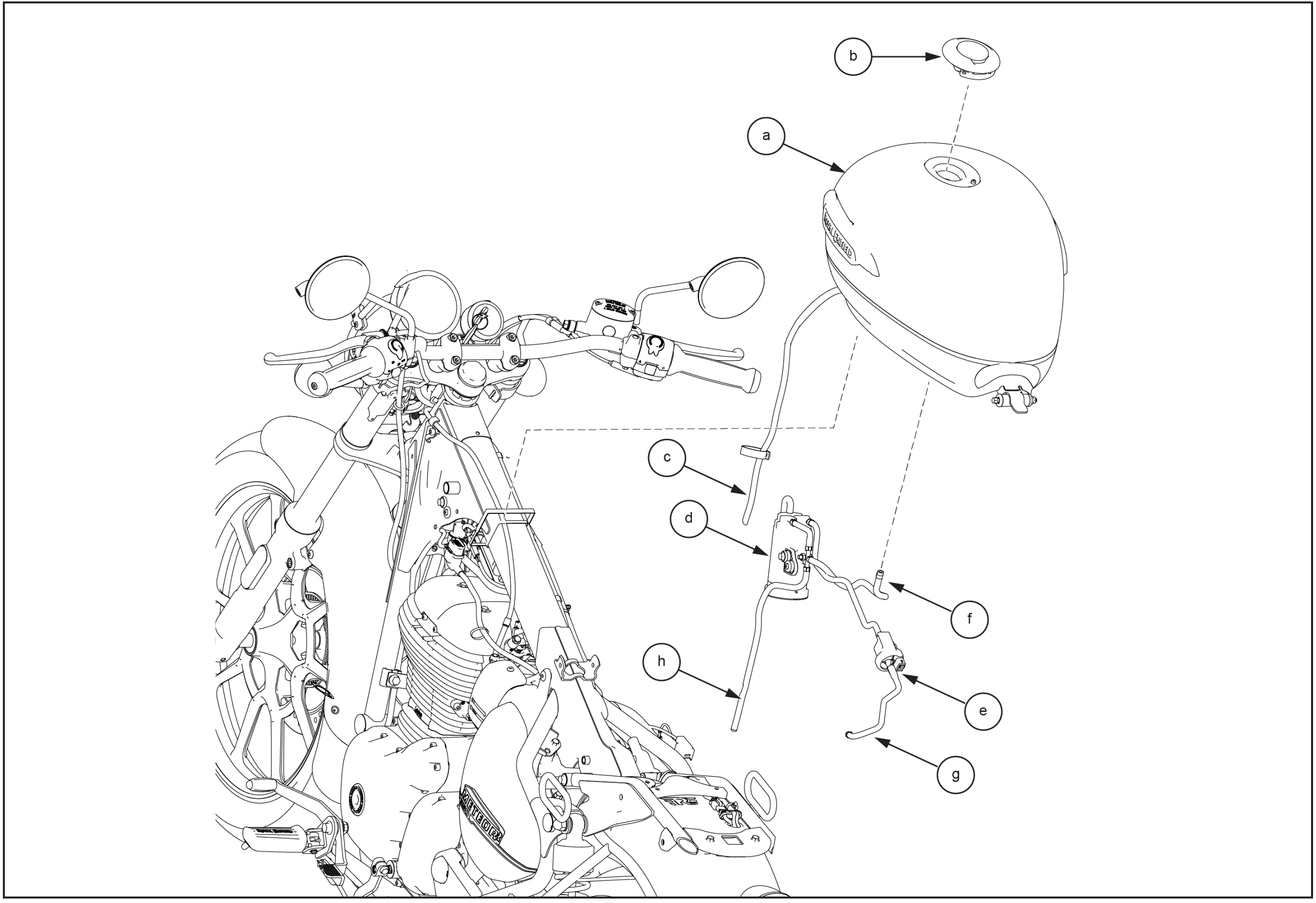
General Description

Royal Enfield motorcycles are equipped with Evaporative (EVAP) Emission Control System.

Whenever the motorcycle is parked after a ride or in hot summer, in high day time temperatures, fuel vapors with hydrocarbons tend to escape into the atmosphere through the vent hole of the fuel tank cap.

The evaporative emission control system traps these fuel vapors and purges it into a charcoal canister. When the engine is running, the vapors from the charcoal canister is routed through a purge valve into the combustion chamber. These vapors are also monitored by the engine management system (EMS) so as to ensure the exhaust emissions are within the specifications.

EVAP Components



Item No.	Description	Quantity	Item No.	Description	Quantity
a	Fuel Tank	1	e	EVAP Purge Valve	1
b	Fuel Tank Cap	1	f	Hose - EVAP	1
c	Hose - Tank Overflow	1	g	Hose- Throttle body	1
d	Charcoal Canister	1	h	Hose - Overflow	1

⚠ WARNING

Before dismantling any part of the EVAP system, ensure the engine and exhaust systems are at ambient temperature. Evaporative fuel vapors are highly inflammable and explosive, which can result in serious injury and or fatal accidents.

⚠ WARNING

DO NOT damage or puncture any part of the EVAP system like canister, purge valve etc. DO NOT blow high compressed air into the canister or purge valve as it can result in an explosion.

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Ensure ignition key and engine stop switch are in OFF position.
- Disconnect battery negative (-) terminal (section 11.5.1).
- Before removing any part of the EVAP system, open fuel tank cap (section 7.1.4) to release the pressure inside.

8.1. Evaporative (EVAP) Emission Control System

Dismantling

8.1.1. Charcoal Canister

- The charcoal canister is located underneath the frame/below fuel tank mounting location.

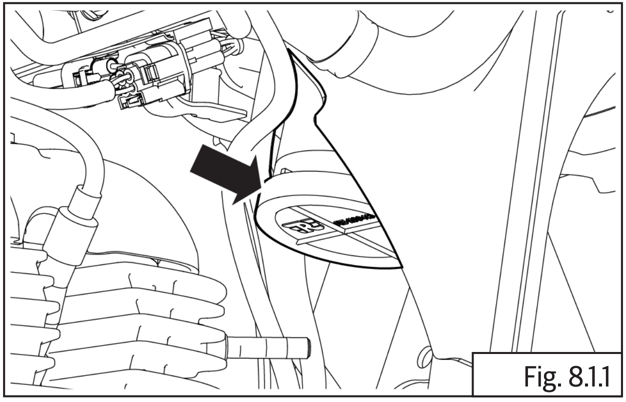


Fig. 8.1.1

- Loosen and remove Hex flange head bolt **(M6) (a)** along with spacer **(b)** from EVAP canister **(c)**.

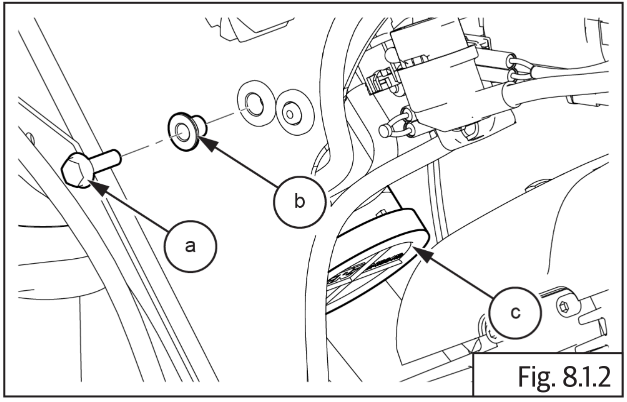


Fig. 8.1.2

🔧	10 mm Socket with Ratchet

- Gently pullout canister **(a)** from frame **(b)**.

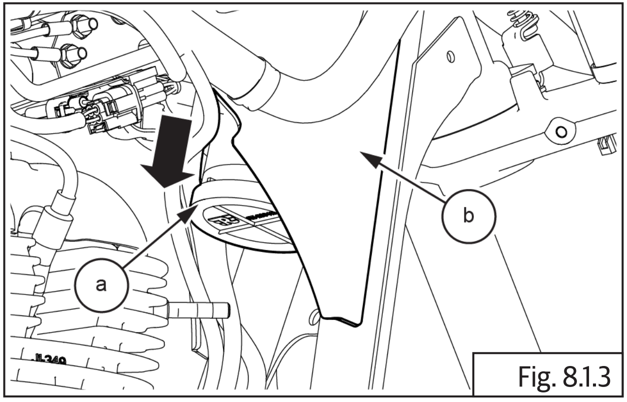


Fig. 8.1.3

⚠ CAUTION

Do not apply excessive force to pull out canister with hoses as it will damage the canister and the hose pipes.

- Disconnect inlet **(a)** and outlet **(b)** hoses from canister **(c)**.

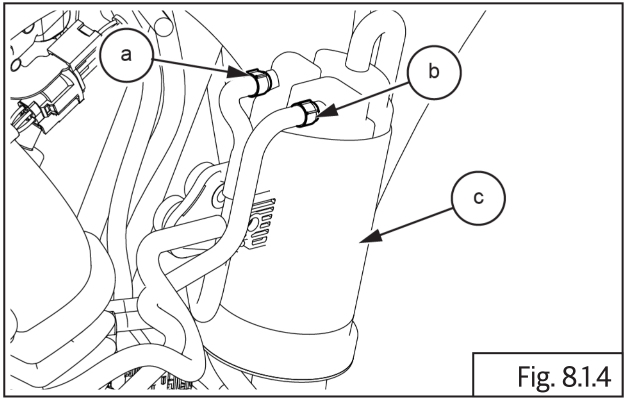


Fig. 8.1.4

- Remove canister and store carefully.

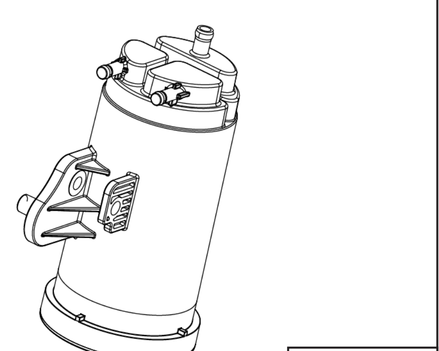


Fig. 8.1.5

8.1.2. EVAP Purge Valve

- Remove the following parts:
  - Side panel RH (section 6.7.1).
  - Rider seat (section 6.7.2).
  - Side panel LH (section 6.7.5).
- Release purge valve **(a)** from the frame **(b)** by pushing backwards.

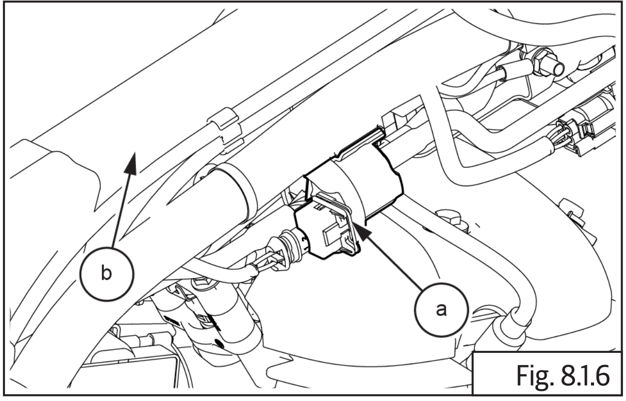


Fig. 8.1.6

- Disconnect electrical connector **(a)** from purge valve **(b)**.

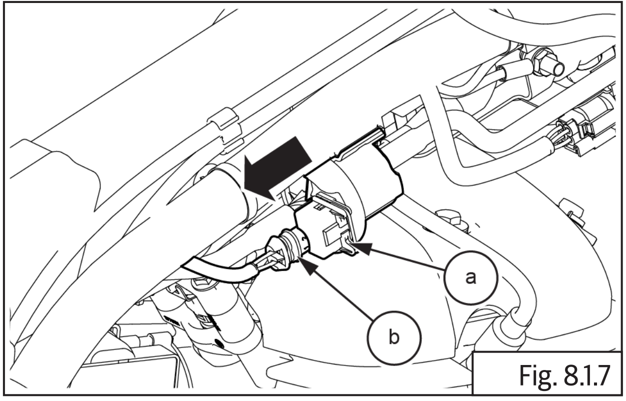


Fig. 8.1.7

- Disconnect hose **(a)** from purge valve **(b)**.

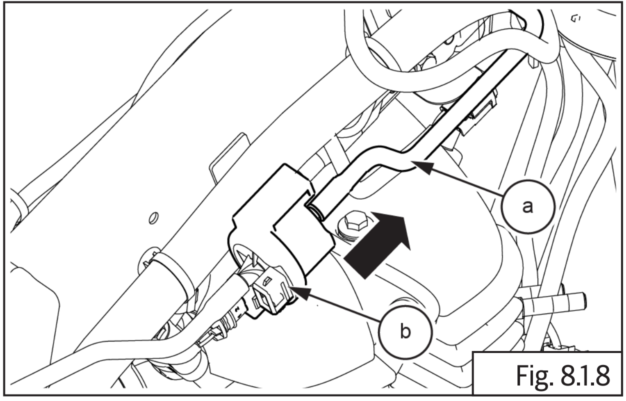


Fig. 8.1.8

- Disconnect hose **(a)** from throttle body **(b)** and purge valve.

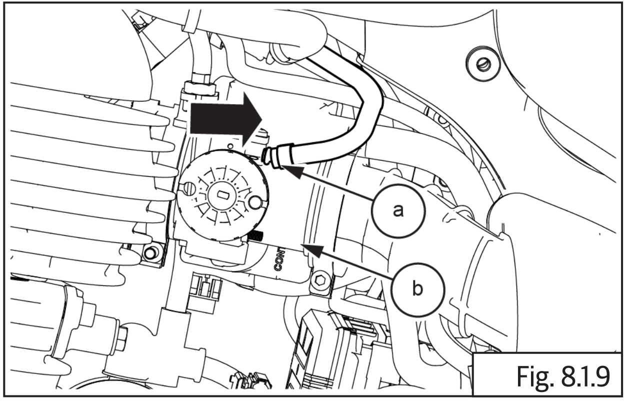


Fig. 8.1.9

- Remove purge valve and store carefully.

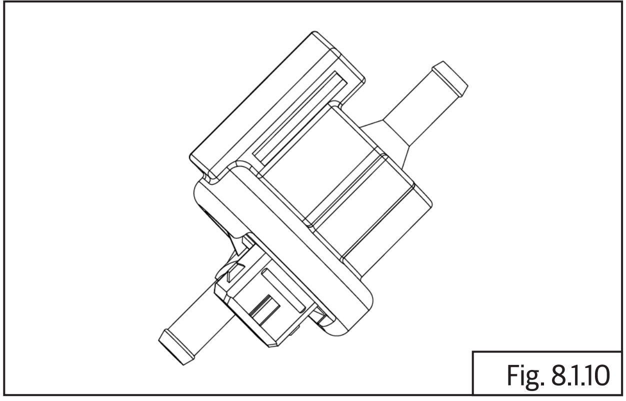


Fig. 8.1.10

Inspection

8.1.3. Charcoal Canister

- Clean and inspect for any damage or crack on canister. Replace if necessary.
- Gently shake canister to feel if there is wet fuel inside. If suspected replace canister (weight 200± 5gms).
- Blow very low pressure air (5 psi) through the inlet port and check for the free flow of outlet side. If restricted or no air, replace the canister.

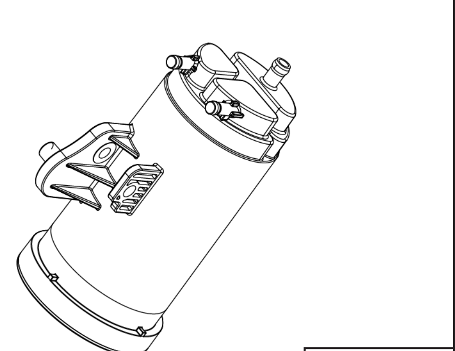


Fig. 8.1.11

8.1.4. Purge Valve

- Clean and visually inspect the EVAP purge valve for any damage or crack.
- Check purge valve in EMS section, replace if found defective.
- Blow low pressure air (5 psi) through hose connecting to throttle body and check for pressure release through hose connecting to canister. If air releases, purge valve is defective and replace.

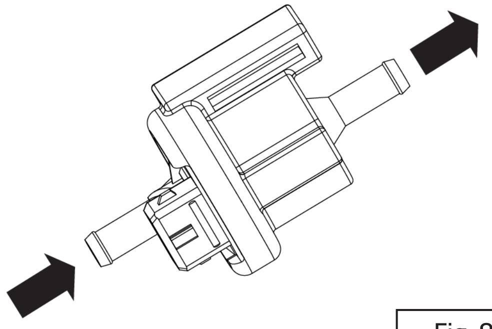


Fig. 8.1.12

8.1.5. Hoses

- Check hose for any crack, pinch, wear out or hardening. Replace if defective.
- Replace hoses as mentioned in periodic maintenance schedule.

8.1.6. Hose Connectors

- Check for any damages or cracks and replace if defective.

Do's & Don'ts

- Do not fill fuel tank above anti-splash plate inside fuel tank as it will cause fuel to get into EVAP system.

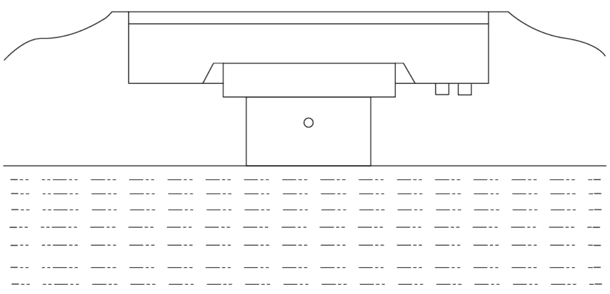


Fig. 8.1.13

- Do not use motorcycle if any part of EVAP system is damaged.
- Do check the EVAP system periodically for damages and leakages.

8.1.7. EVAP System Leak Test Procedure

- Ensure the systems hoses are connected correctly.
- Block the EVAP atmosphere breather.
- Block the LH side throttle body Hose, Purge.
- Connect a hose to the fuel tank to EVAP hose to allow a pressure to be applied.
- Connect another hose to the RH side throttle body Hose, Purge.
- Pressurise the system through both the Evap Canister atmosphere breather and the RH side throttle body Hose, Purge at the same time as below:
    1. Fill at 20kPa for 20 Seconds.
    2. Stabilize, 50 Seconds.
    3. Drop less than 300 Pa over 5 minutes.

Assembly

8.1.8. EVAP Purge Valve

- Connect throttle body hose **(a)** to outlet near wiring coupler in purge valve.
- Connect hose **(b)** to inlet of purge valve from canister.

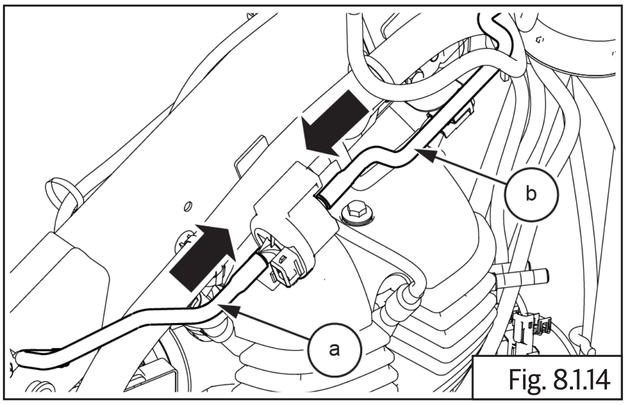


Fig. 8.1.14

- Connect the electrical connector **(a)** to purge valve.

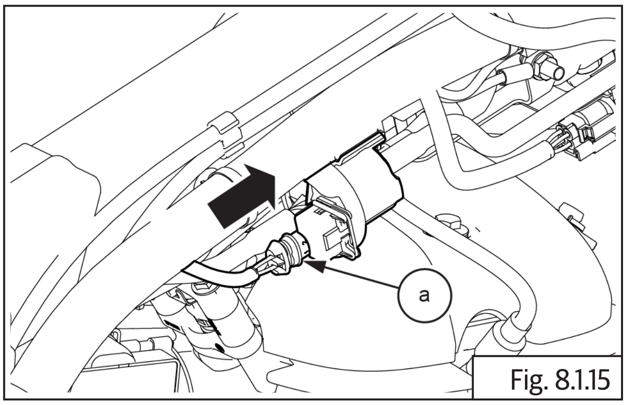


Fig. 8.1.15

- Locate purge valve **(a)** in the frame.

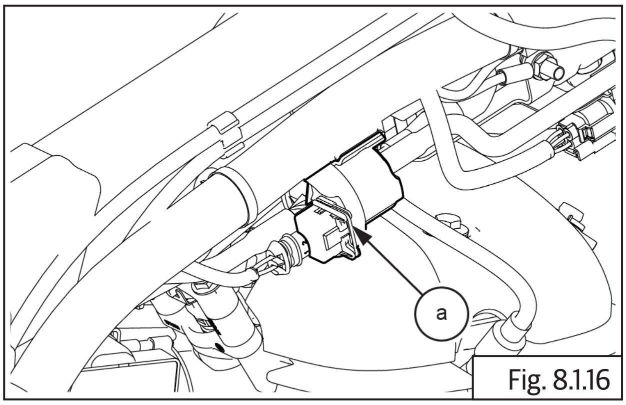


Fig. 8.1.16

- Assembly the following parts:
    - Side panel LH (section 6.7.5).
    - Rider seat (section 6.7.7).
    - Side panel RH (section 6.7.8).

8.1.9. Charcoal Canister

- Connect hose **(a)** from fuel tank to T-joint in the inlet of the canister.
- Connect hose from purge valve **(b)** to outer pipe marked "purge" in canister **(c)**.
- Ensure hoses are seated properly.

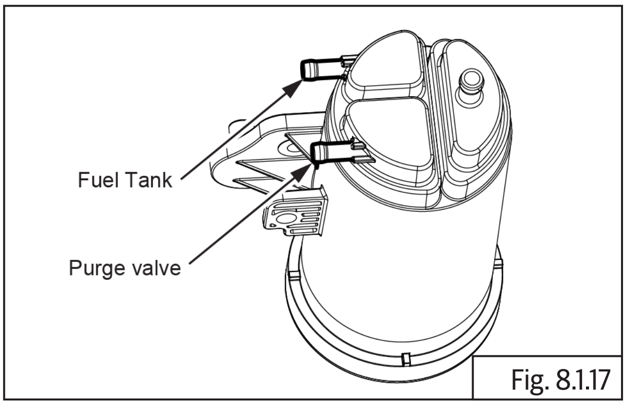


Fig. 8.1.17

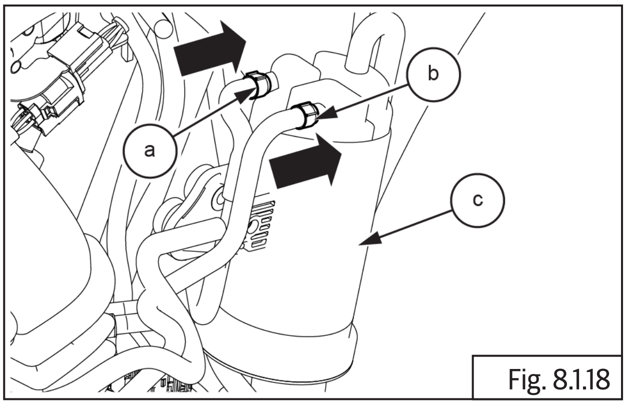


Fig. 8.1.18

- Locate canister **(a)** on bracket **(b)** in frame. Push it completely to lock in place.

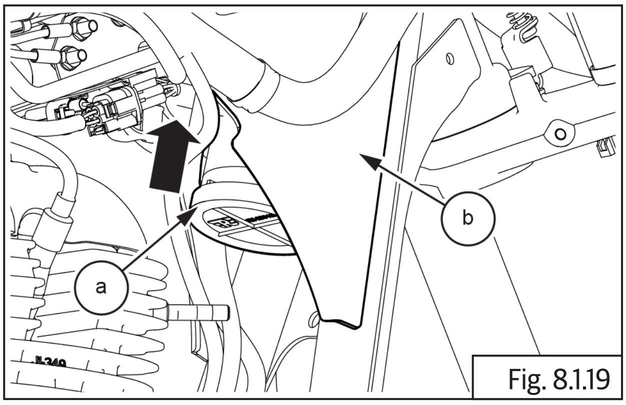


Fig. 8.1.19

- Locate bolt **(a)** along with spacer **(b)** on the canister in frame**(c)**.

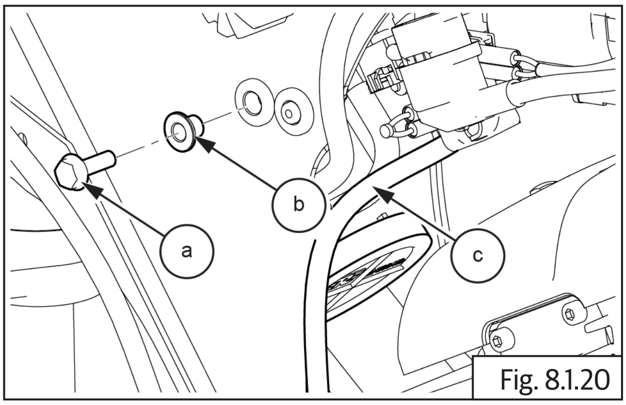


Fig. 8.1.20

	10 mm Socket with Ratchet
Torque	8-10 N·m/0.8-1.0 kgf m

- Check canister dummy plug **(a)** for full insertion.

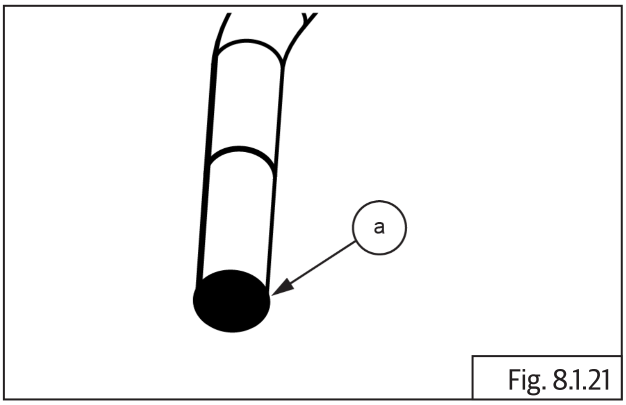


Fig. 8.1.21

- Reassemble the following parts:
  - Fuel tank (section 7.1.15).
  - Side panel LH (section 6.7.5).
  - Seat (section 6.7.7).
  - Side panel RH (section 6.7.8).

BRAKES AND ABS

Brakes and ABS

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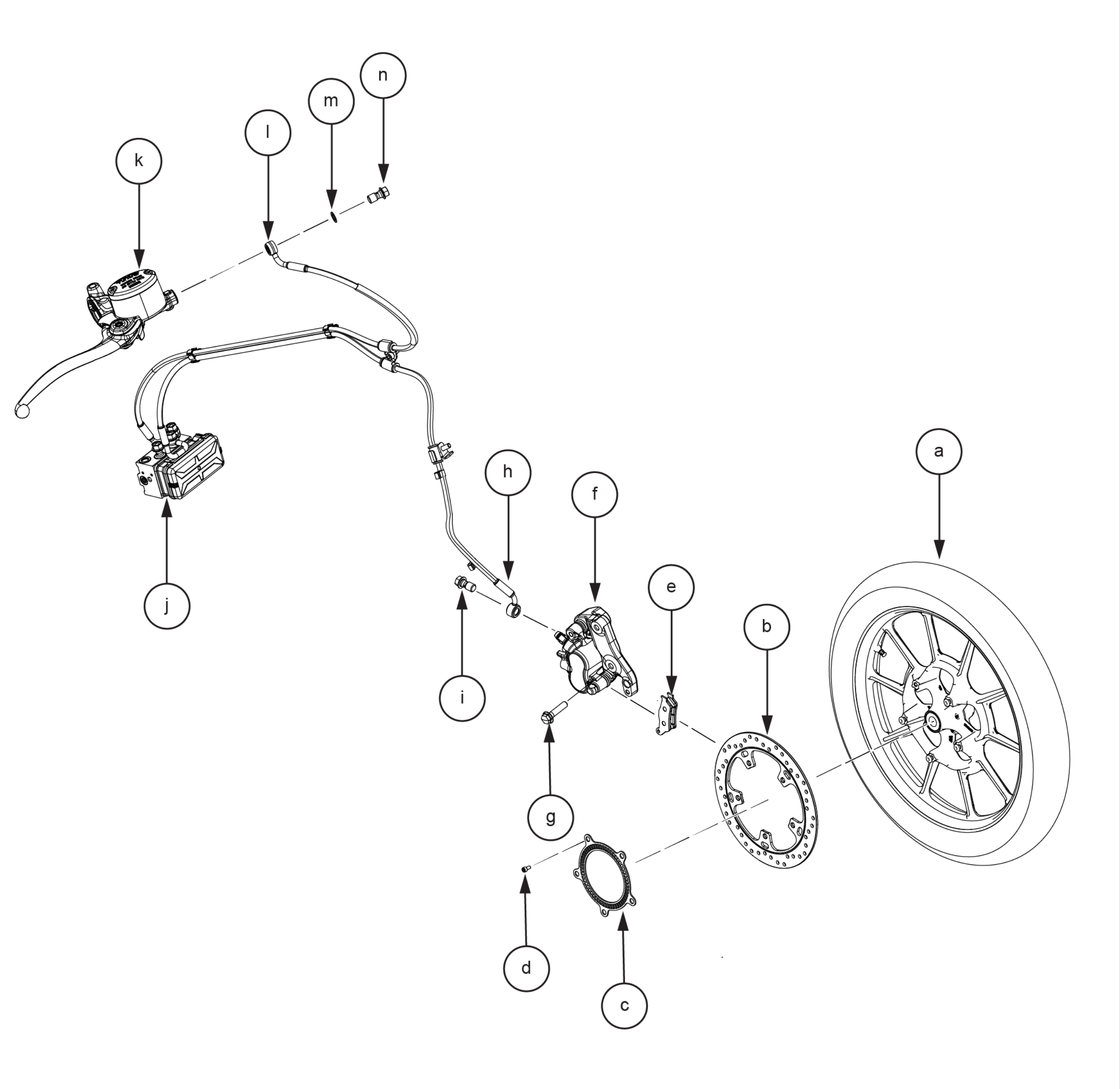
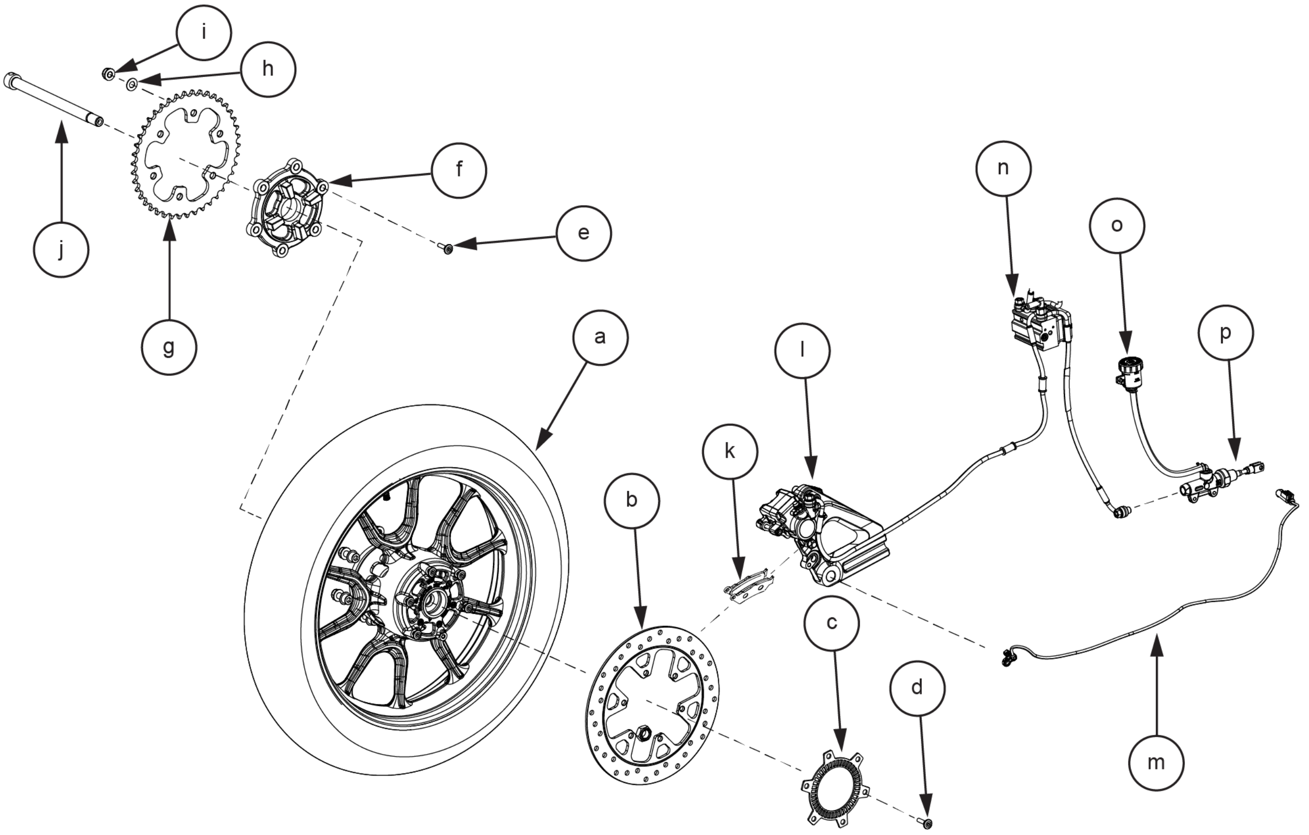
Brake - Front



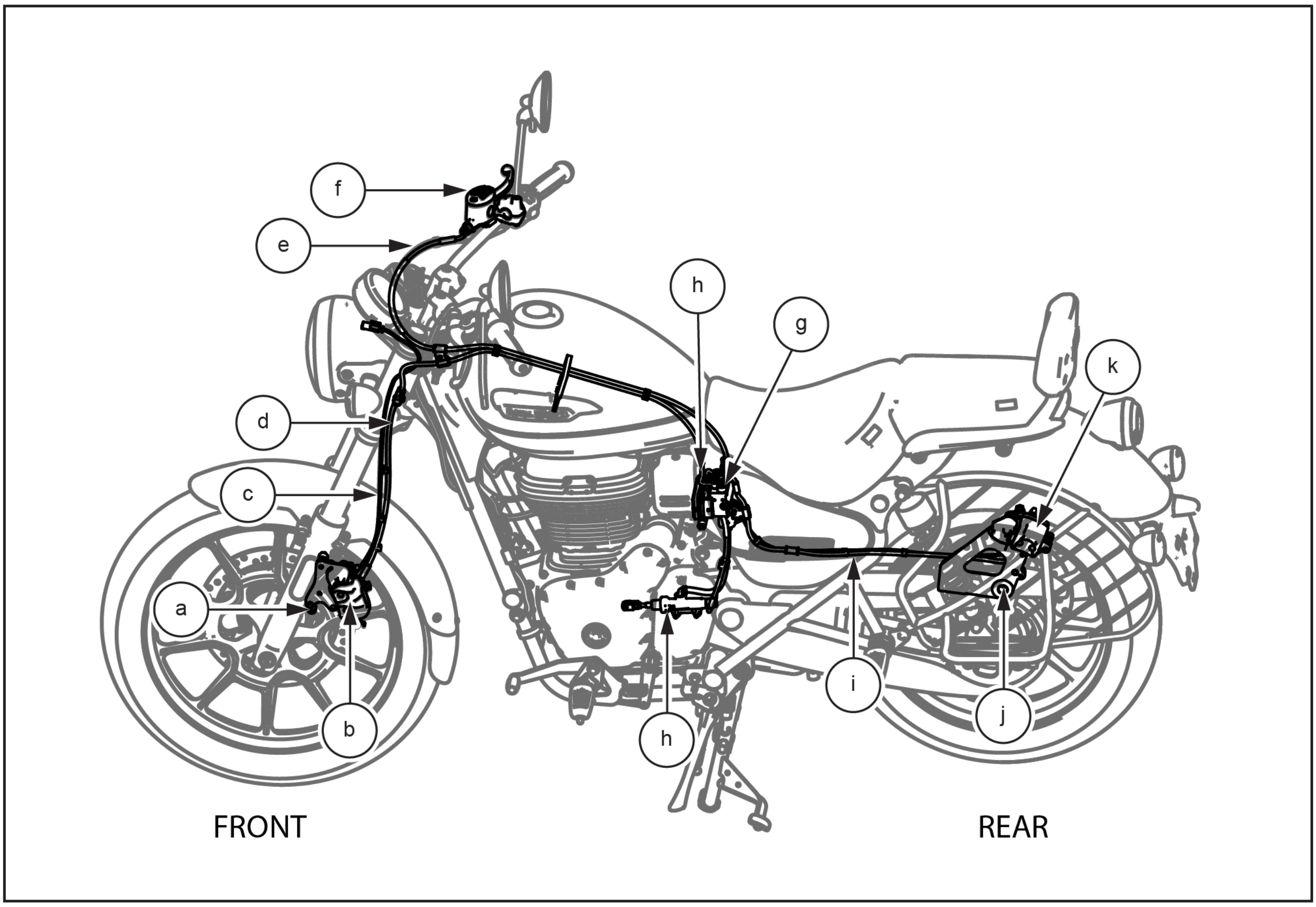
Item No.	Description	Quantity	Item No.	Description	Quantity
a	Wheel	1	j	ABS Modulator	1
b	Front Brake Disc	1	k	Front Master Cylinder Assy	1
c	Toner Wheel		l	Hose, Master cylinder to modulator	1
d	Hex Soc Head Screw M8	5	m	Copper Washer	1
e	Brake Pad Set	1	n	Banjo Bolt	1
f	Brake Caliper Assembly	1			
g	Brake Caliper Mounting Bolt M10	2			
h	Hose, Modulator to Brake Caliper	1			
i	Banjo Bolt	1			

Brake - Rear



Item No.	Description	Quantity	Item No.	Description	Quantity
a	Wheel	1	i	Nut M8	6
b	Brake Disc Rear	1	j	Wheel Spindle	1
c	Toner Wheel	1	k	Rear Brake Pad Set	1
d	Bolt M6	6	l	Rear Brake Caliper Assy	1
e	Bolt M8-Sprocket	6	m	Rear Wheel Speed Sensor	1
f	Sprocket Carrier	1	n	ABS Modulator	1
g	Sprocket Driven	1	o	Brake Fluid Reservoir	1
h	Washer	6	p	Rear Master Cylinder Assembly	1

Anti-lock Brake System



Item No.	Description	Quantity	Item No.	Description	Quantity
a	Wheel Speed Sensor - ABS - Front	1	i	Connector Wheel Speed Sensor ABS - Rear	1
b	Brake Caliper Assembly - Front	1	j	Rear Caliper Mounting Bracket	1
c	Hose ABS Modulator to Front Caliper	1	k	Rear Brake Caliper	1
d	Hose Guide	2			
e	Hose ABS Modulator to Front Master Cylinder	1			
f	Master Cylinder Assembly - Front	1			
g	ABS Modulator	1			
h	Connector Wheel Speed Sensor ABS - Front	1			

9. Brakes and ABS

Dismantling

9.1. Brake - Front

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

Support motorcycle with suitable equipment below swing arm frame.

- Before dismantling brake assembly, bleed out brake fluid (section 9.8.1).

NOTE

- *If brake pads are being replaced, then it is not necessary to perform system bleeding.*
- *Wheel should be dismantled only for brake disc plate removal.*

⚠ CAUTION

Whenever front brake caliper assembly is dismantled from front wheel, DO NOT press brake lever as the piston in the caliper will move out/get misaligned.

DO NOT remove or disturb the wheel speed sensor on fork end LH.

9.1.1. Master Cylinder Assembly - Front

- Remove the following part:
- Rear view mirror from handlebar RH (section 6.3.1).

⚠ CAUTION

Ensure master cylinder assembly is supported carefully while disconnecting.

- Disconnect brake lamp switch connectors **(a)** from brake lamp switch **(b)**.

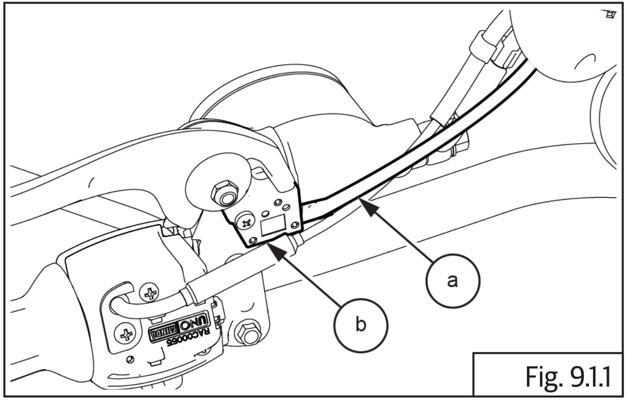


Fig. 9.1.1

- Loosen and remove banjo bolt **(a)** holding the brake hose **(b)** to front master cylinder to ABS modulator **(c)**.

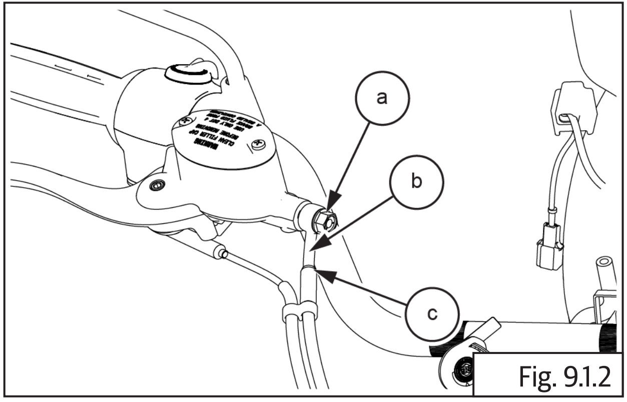


Fig. 9.1.2

🔧	12 mm Socket with Ratchet

- Loosen and remove 2 Nos. Hex bolts **(M5) (a)** along with washers from clamp and remove master cylinder assembly from handlebar RH.

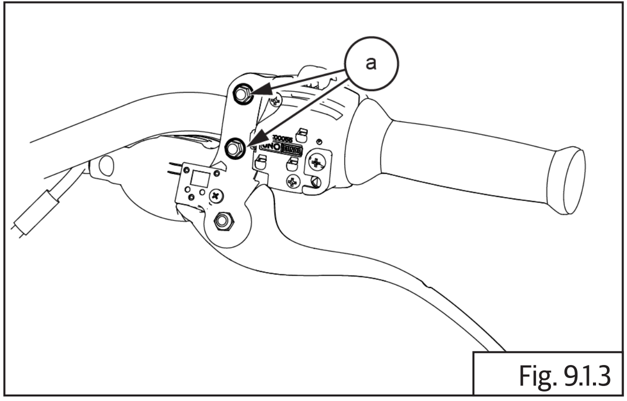


Fig. 9.1.3

🔧	8 mm Socket with Ratchet

- Hold screw **(a)** at the top of brake lever, loosen and remove hex nut **(M6) (b)** at the bottom.

- Unscrew and remove top screw holding brake lever to master cylinder and remove brake lever.

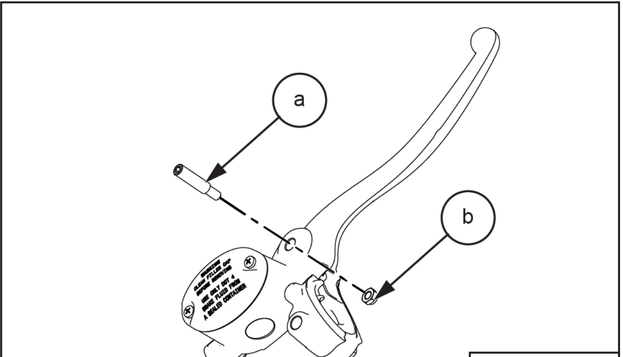


Fig. 9.1.4

🔧	4 mm Allen Socket and 10 mm Double end spanner

Dismantling Master Cylinder Front

- Remove boot **(a)** from the master cylinder assembly **(b)**.

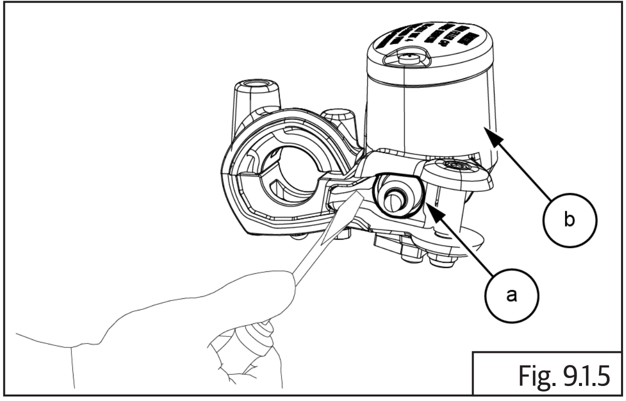


Fig. 9.1.5

🔧	Screw driver

- Remove circlip **(a)** from the master cylinder assembly **(b)**.

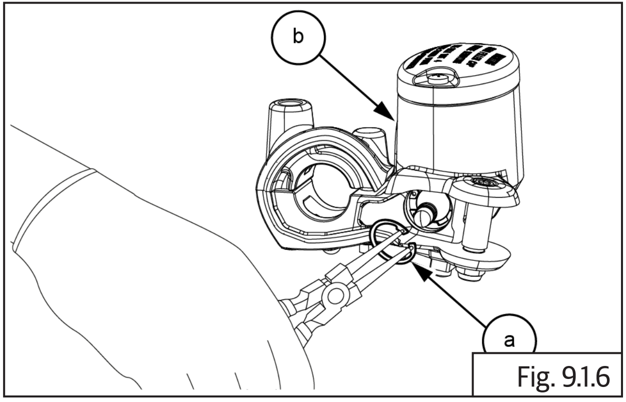


Fig. 9.1.6

🔧	Circlip plier

- Remove the conical spring (piston compression spring) **(a)** from piston **(b)** .

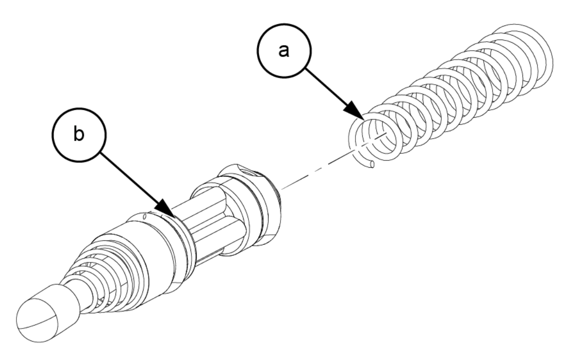


Fig. 9.1.7

9.1.2. Brake Caliper - Front

- Gently remove hose from caliper assembly (section 9.3.1).
- Support the front brake caliper assembly suitably.
- Loosen and remove upper and lower Hex flange head bolts **(M10) (a)** to remove front brake caliper assembly **(b)** from LH fork.

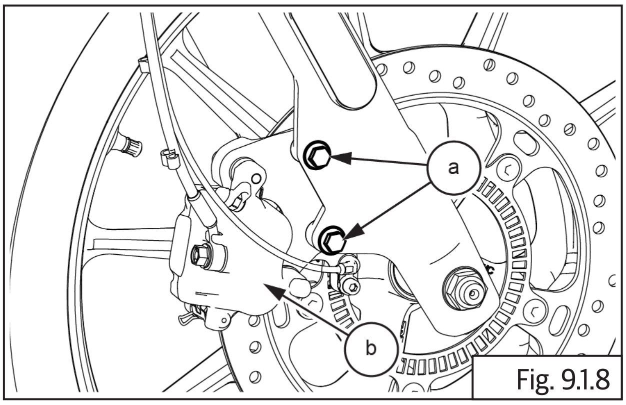


Fig. 9.1.8

12 mm Socket with Ratchet

- Gently slide out front brake caliper assembly from front RH fork.
- Remove brake pad lock clip **(a)** from brake caliper assembly **(b)**.

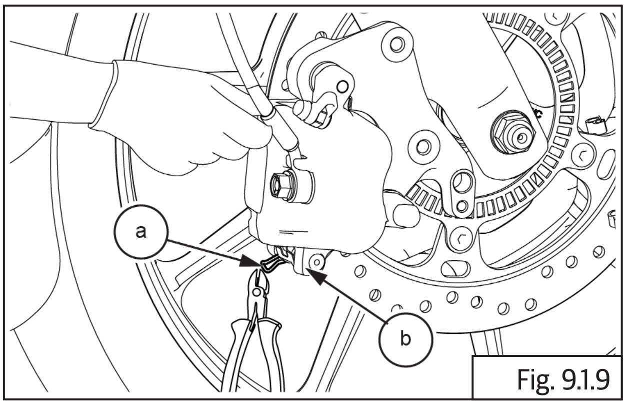


Fig. 9.1.9

Nose plier

- Suitably support caliper and correctly tap brake pad pin **(a)** from inner side to outside.

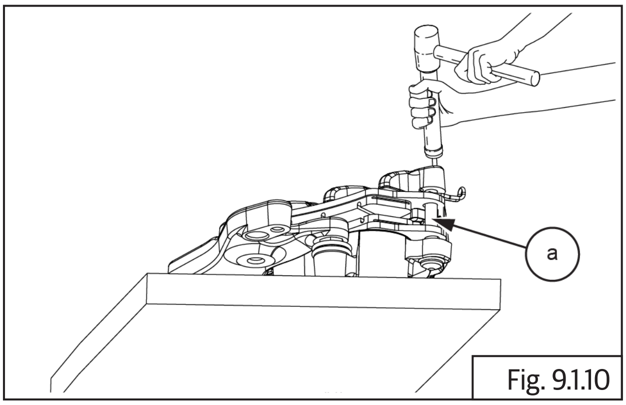


Fig. 9.1.10

- Once pin **(a)** is free, gently pull out pin from brake caliper.

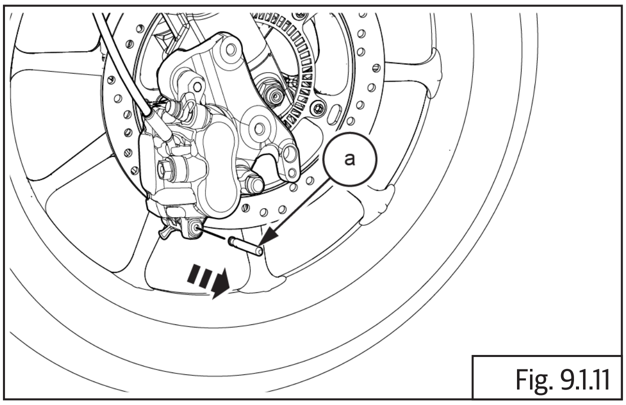


Fig. 9.1.11

- Slide out and remove brake pads **(a)** from brake caliper front **(b)**.

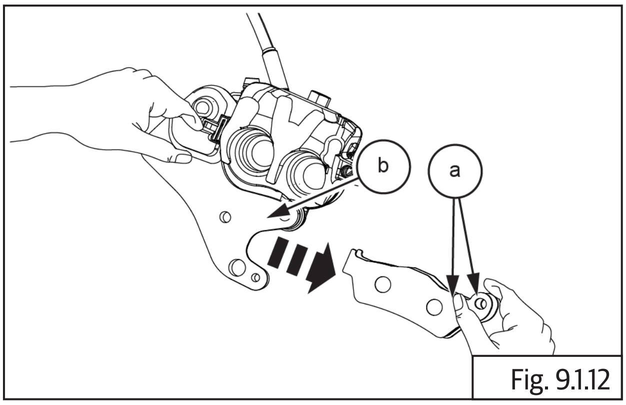


Fig. 9.1.12

Dismantling Front Brake Caliper

- Remove the pad tensioner spring plate **(a)**.

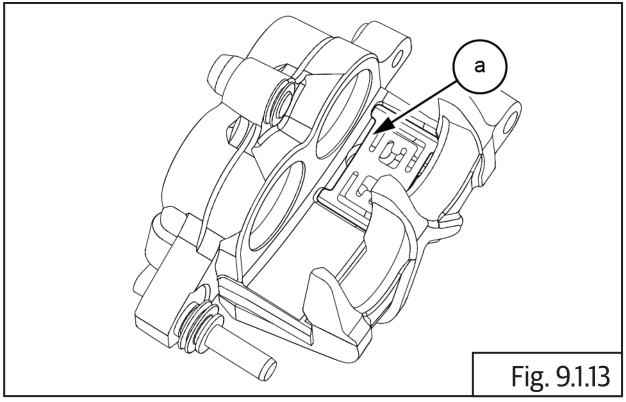


Fig. 9.1.13

- Remove mounting bracket from caliper assembly.

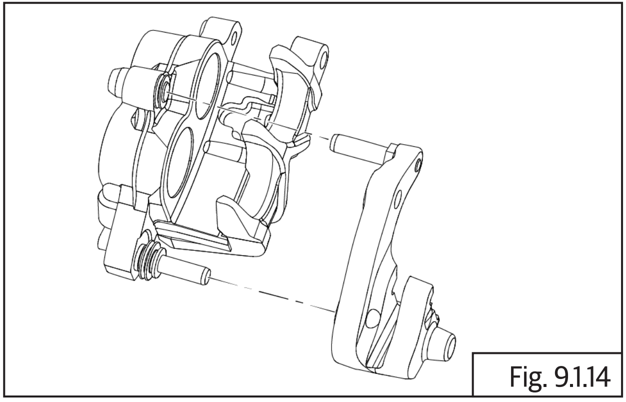


Fig. 9.1.14

- Position caliper body with the pistons down and apply small squirts of air pressure to fluid inlet hole to remove pistons.

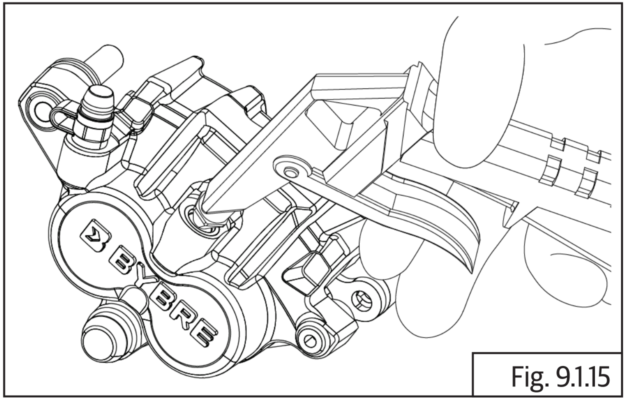


Fig. 9.1.15

⚠ CAUTION

Do not use high pressure air or bring the nozzle too close to the inlet. Place a shop towel over the pistons to prevent the pistons from becoming projectiles. Push the dust seals and piston seals in and lift them out using a blunt tool. Care should be taken to avoid any damages on the bore of the sliding surface.

Enough care should be taken to avoid damages of the piston OD while servicing/handling. Remove the bleed screw.

9.1.3. Brake Disc - Front

- Remove front wheel (section 6.8.1).
- Ensure wheel assembly is placed on a flat surface with disc plate facing upwards.

⚠ CAUTION

Ensure wheel hub does not get damaged.

- Loosen and remove 5 Nos. Hex socket head bolts **(M8) (a)** from wheel RH in criss cross pattern holding toner ring and brake disc to hub.

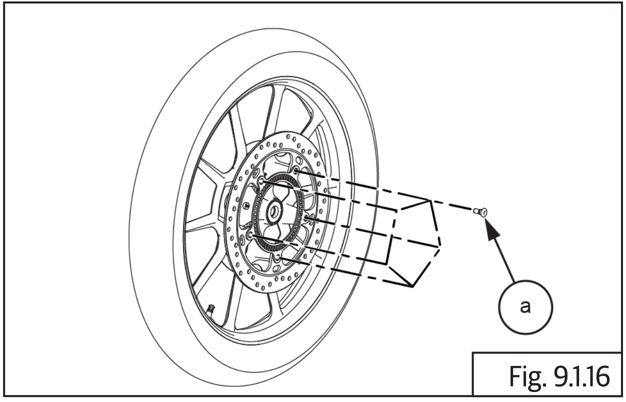


Fig. 9.1.16

🔧	6 mm Allen socket with Ratchet

⚠ WARNING

DO NOT place/store the wheel with disc facing downward. It will cause bends and damages and change warpage.

- Remove toner wheel **(a)** and keep it aside safely.

⚠ CAUTION

Avoid any bends or damages to the toner wheel as it will have serious effects on ABS performance.

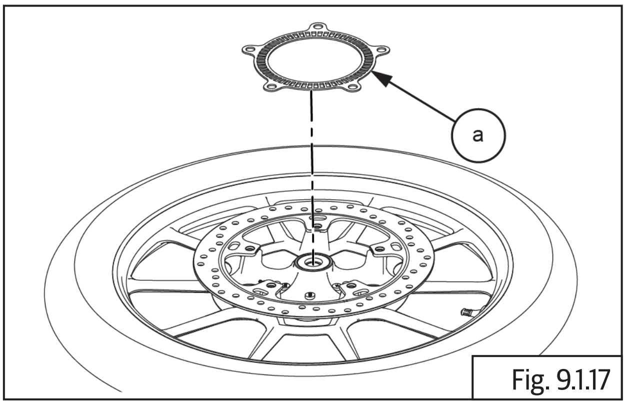


Fig. 9.1.17

- Remove front brake disc **(a)**.

⚠ CAUTION

Avoid any bends or damages to the brake disc as it will have serious effects on braking efficiency and will lead to juddering.

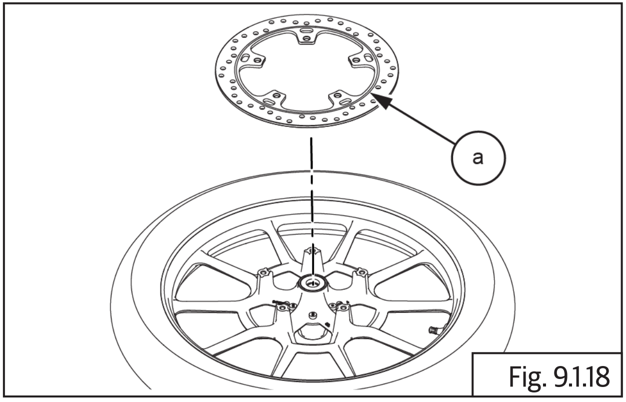


Fig. 9.1.18

9.2. Brake - Rear

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

Support motorcycle with suitable equipment below swing arm frame.

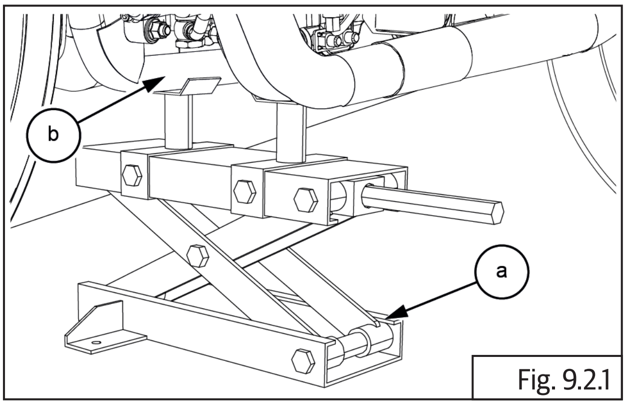


Fig. 9.2.1

9.2.1. Master Cylinder Assembly - Rear

- Remove split pin **(a)** from clevis pin located at the bottom of master cylinder assembly.

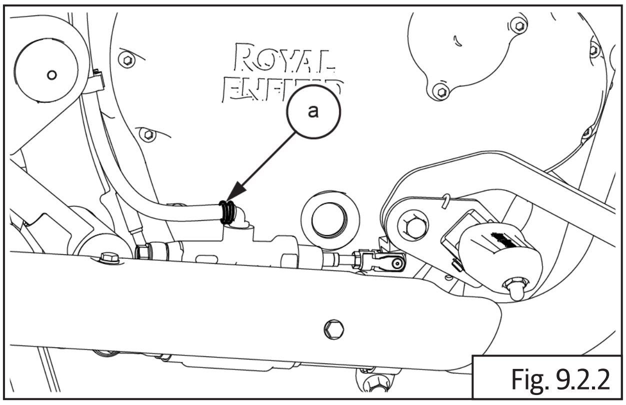


Fig. 9.2.2

🔧	Nose plier

- Remove reservior hose **(a)** from master cylinder.

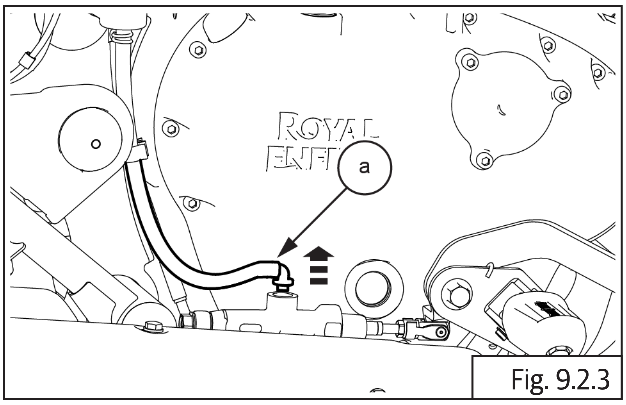

ROYAL ENFIELD
a

Fig. 9.2.3

- Collect brake fluid in container.

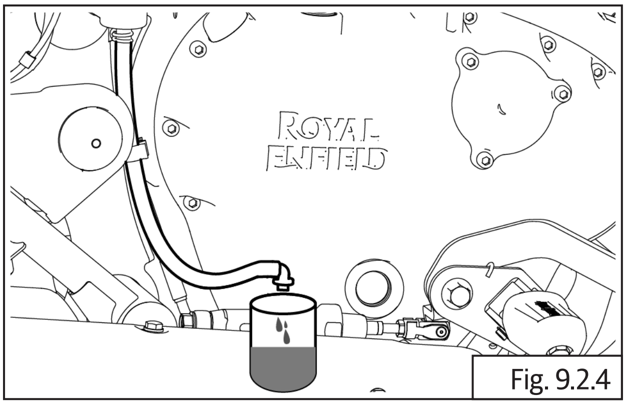

ROYAL ENFIELD

Fig. 9.2.4

- Loosen and remove 1 No. Allen bolts **(a)** to remove oil reservoir **(b)** from frame.

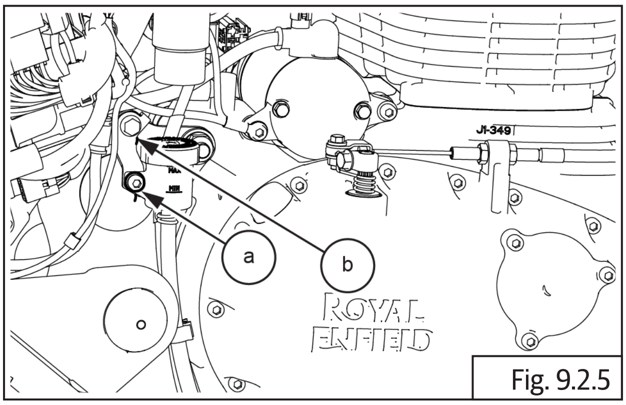

J1-349
a
b
ROYAL ENFIELD

Fig. 9.2.5

4 mm Allen socket with Ratchet

- Loosen and remove 1 Nos. Hex socket head banjo bolt **(a)** along with copper washer **(b)** and brake hose **(c)**.

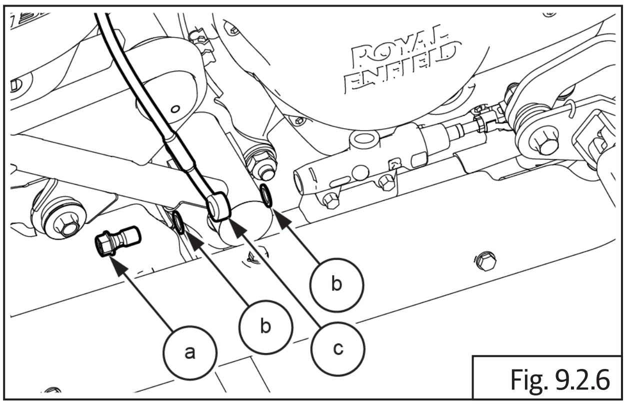

ROYAL ENFIELD
b
b
a
c

Fig. 9.2.6

12 mm Socket with Ratchet

- Loosen and remove 2 Nos. Hex socket head bolt **(a)** to remove master cylinder from frame.

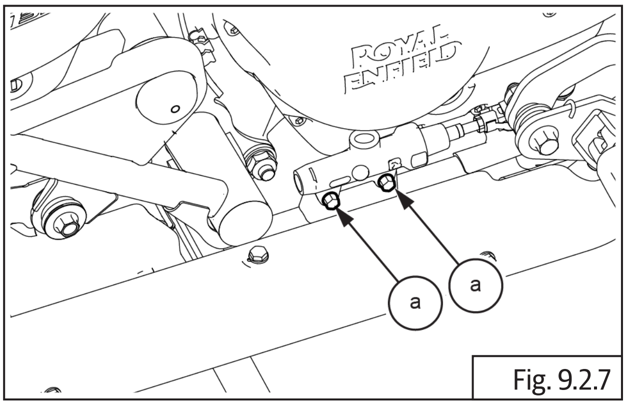

ROYAL ENFIELD
a
a

Fig. 9.2.7

10 mm Socket with Ratchet

Dismantling Rear Brake Master Cylinder

- Remove protective rubber boot from master cylinder.

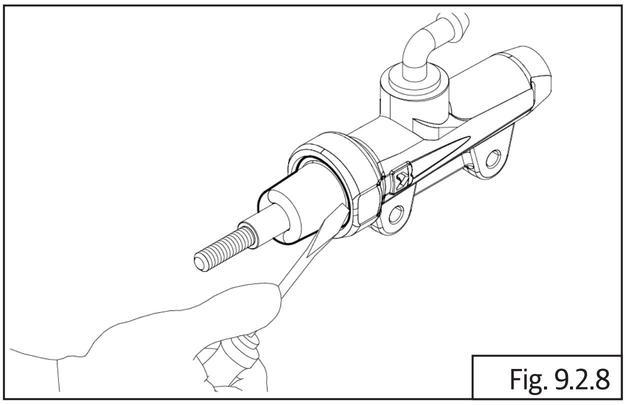


Fig. 9.2.8

	Screw driver

- Remove **(a)** circlip from the master cylinder body **(b)** slowly and carefully.

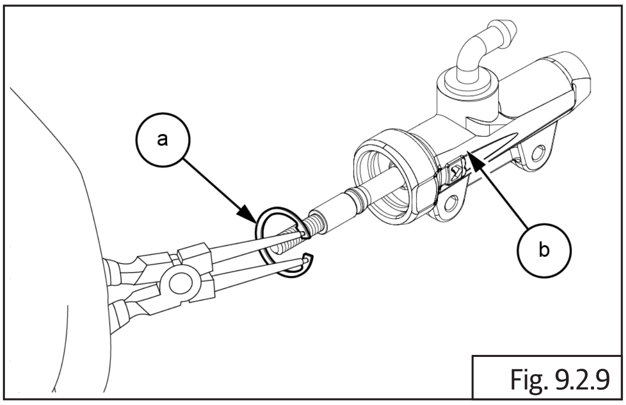


Fig. 9.2.9

	Circlip plier

- Gently pull out bush **(a)** with piston **(b)**, seals, spring guide and conical spring from master cylinder housing **(c)**.

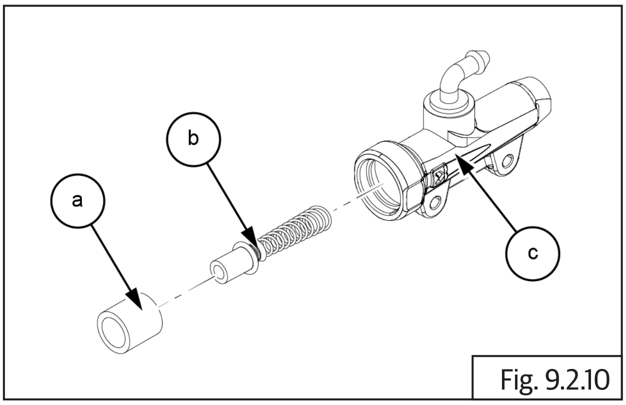


Fig. 9.2.10

⚠ CAUTION

Do not use any sharp tool to pull out the piston from the master cylinder. Pull out gently with minimum force.

Rear Brake Pedal

- Loose and remove 1 No.Allen bolt **(a) (M10)** along with brake pedal **(b)** from motorcycle.

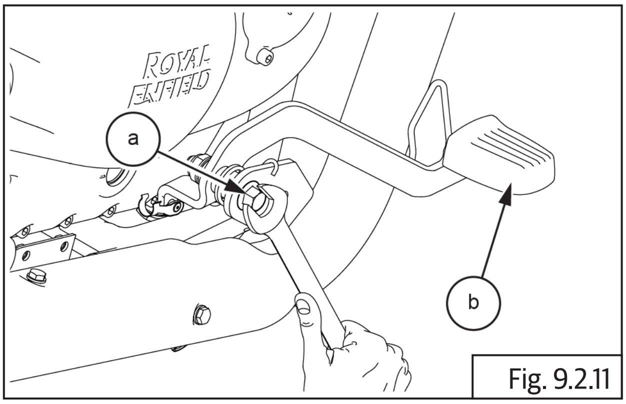


Fig. 9.2.11

- Remove spring **(a)** from brake pedal **(b)**.

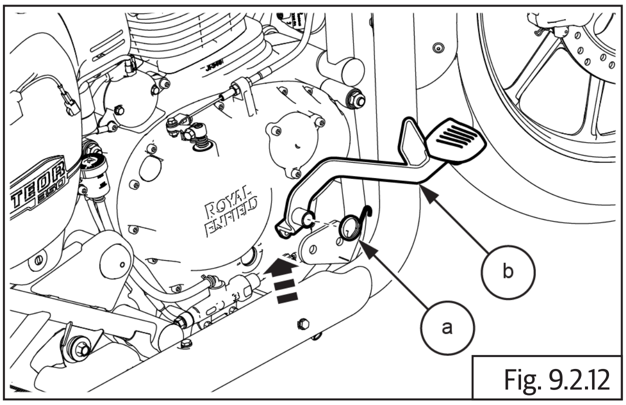


Fig. 9.2.12

9.2.2. Brake Caliper Assembly - Rear

- Remove the following:
  - Rear wheel spindle and chain adjuster assembly from rear wheel (section 6.8.3).
- Loosen and remove Hex socket head screw **(M6)** **(a)** located below brake caliper on RH rear wheel to remove wheel speed sensor.

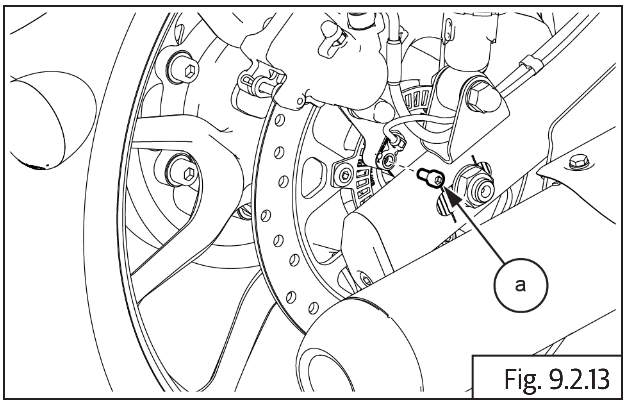


Fig. 9.2.13

5 mm Allen socket with Ratchet

- Gently remove rear wheel speed sensor ABS **(a)** from rear wheel hub.

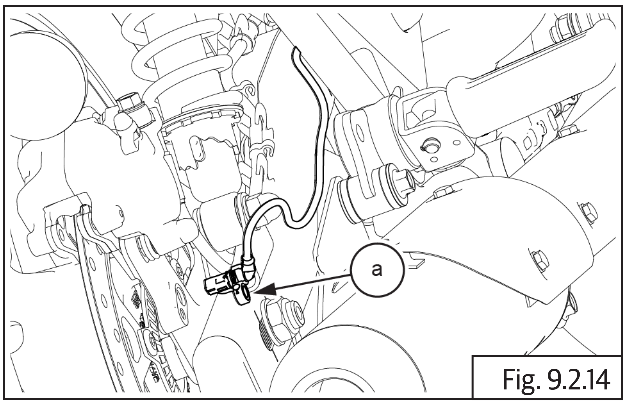


Fig. 9.2.14

- Remove brake pad outer clip **(a)** from brake pad lock pin.

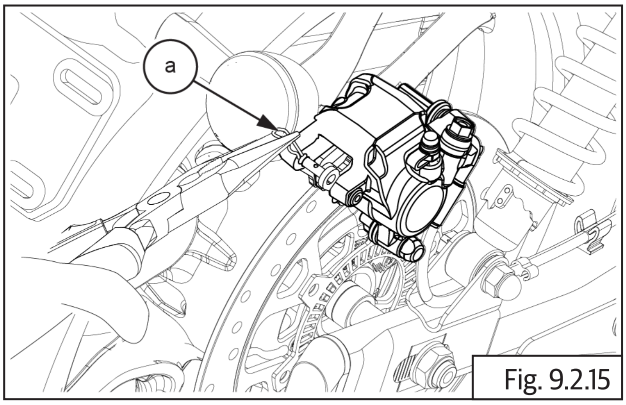


Fig. 9.2.15

Nose plier

- Remove brake pad inner clip **(a)** from brake pad lock pin.

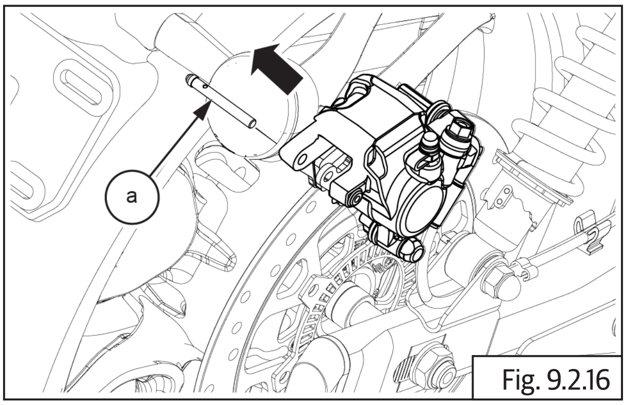


Fig. 9.2.16

Nose plier

- Slide out and remove brake pads **(a)** from brake caliper.

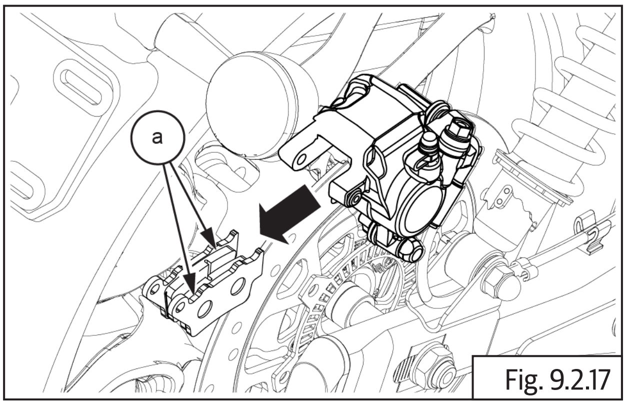


Fig. 9.2.17

- Slide out and remove brake caliper **(a)** with holder.

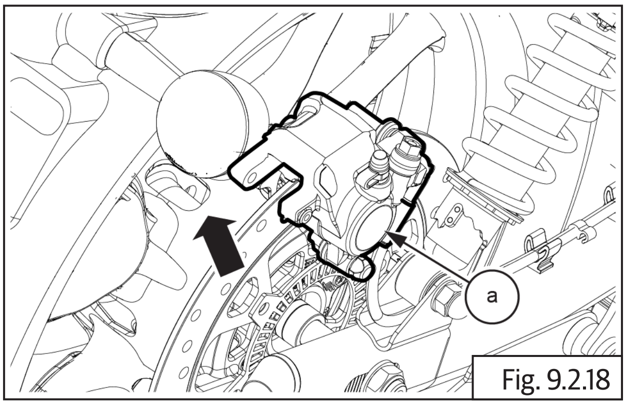


Fig. 9.2.18

Dismantling Rear Brake Caliper

- Separate the mounting bracket from the caliper assembly by gently pulling them apart.

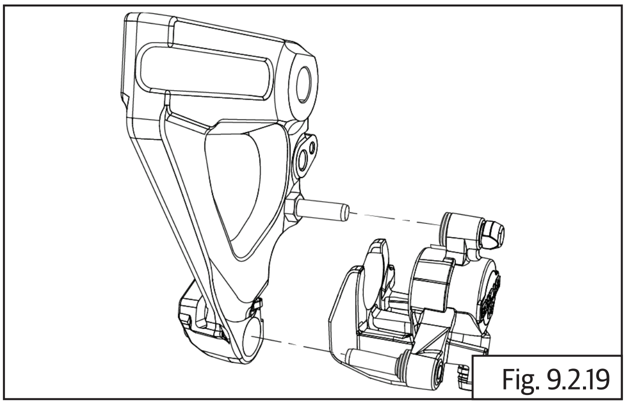


Fig. 9.2.19

- Position caliper body with pistons down and apply small squirts of air pressure to the fluid inlet hole to remove pistons.

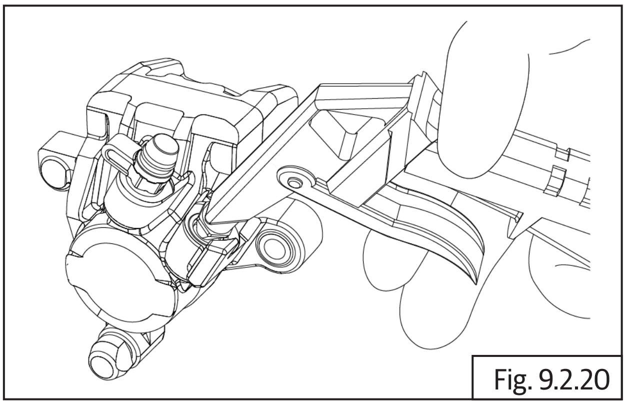


Fig. 9.2.20

⚠ CAUTION

DO NOT use high pressure air or bring the nozzle too close to the inlet. Place a shop towel over the pistons to prevent the pistons from becoming projectiles. Push the dust seals and piston seals in and lift them out using a blunt tool. Care should be taken to avoid any damage on the bore of the sliding surface.

Enough care should be taken to avoid damages of the piston OD while servicing/handling. Remove the bleed Screw.

9.2.3. Brake Disc - Rear

- Remove drive chain and rear wheel from swing arm (section 6.8.3).
- Loosen and remove 6 Nos. Allen head bolts **(M6)** **(a)** from rear wheel disc hub RH **(b)**.

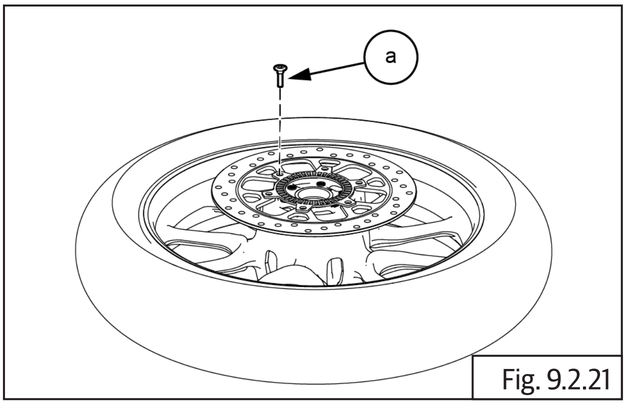


Fig. 9.2.21

🔧	5 mm Allen Socket with Ratchet

- Remove ABS toner wheel **(a)** from rear wheel hub RH.

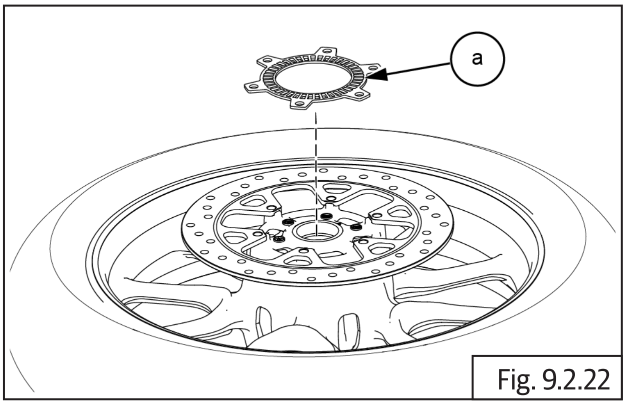


Fig. 9.2.22

- Remove rear disc plate **(a)** from rear wheel hub RH **(b)** and keep aside safely.

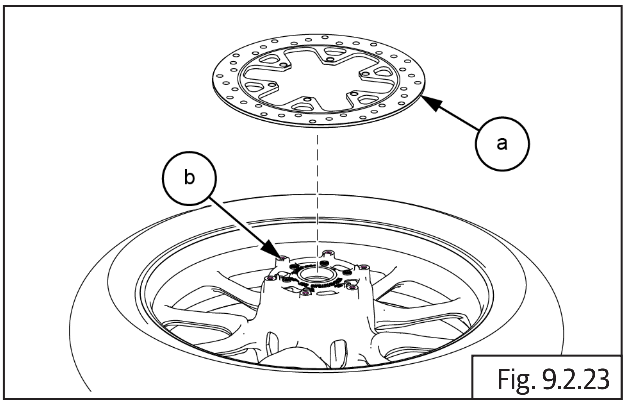


Fig. 9.2.23

Inspection

- Inspect for rust, deep scoring, any foreign materials, burn marks crack in the mounting location of front and rear brake discs.
- Inspect front and rear brake disc thickness and run-out. Measure depth at points where scoring is found on the discs and replace if there is excess wear. (Need to confirm).

Standard:	0.00 mm
Service limit:	0.10 mm

- Also measure thickness at the points indicated in the illustration and replace disc if out of specifications.

Front brake disc.

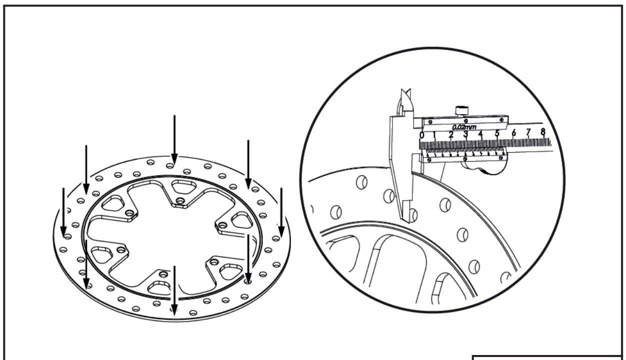


Fig. 9.2.24

Rear brake disc.

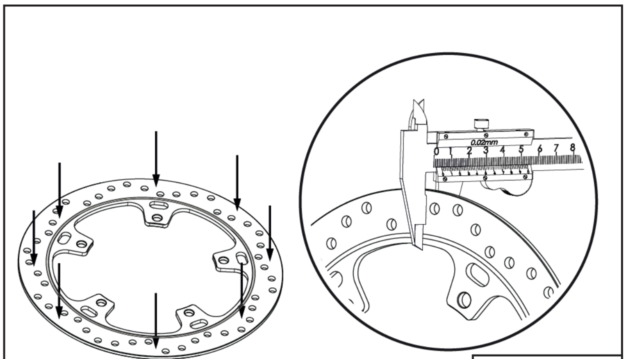


Fig. 9.2.25

	Vernier caliper

Service limit:	0.8 mm

- Place brake disc rotor on a flat surface and inspect warpage. Replace if it is out of specifications.

Front brake disc.

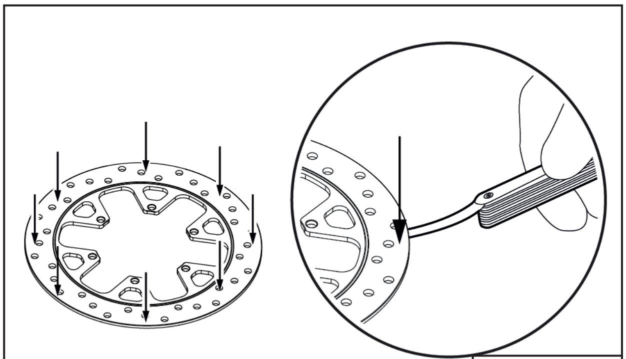


Fig. 9.2.26

Rear brake disc.

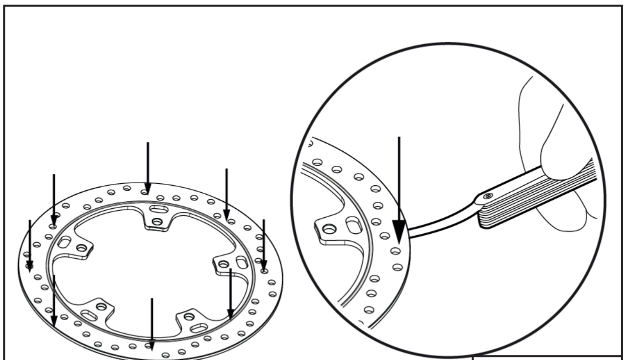


Fig. 9.2.27

	Feeler gauge

Standard:	0.00 mm
Service limit:	0.10 mm

- Inspect and replace toner wheel front if there are any damages or bends.
- Place toner wheel front on a flat surface and check warpage. Replace if out of specifications.

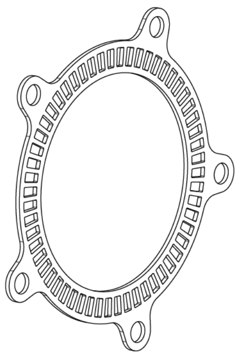


Fig. 9.2.28

- Inspect and replaces toner wheel rear ABS **(a)** if there are any damages bends.
- Place ABS toner wheel on a flat surface and check warpage. Replace if out of specifications.

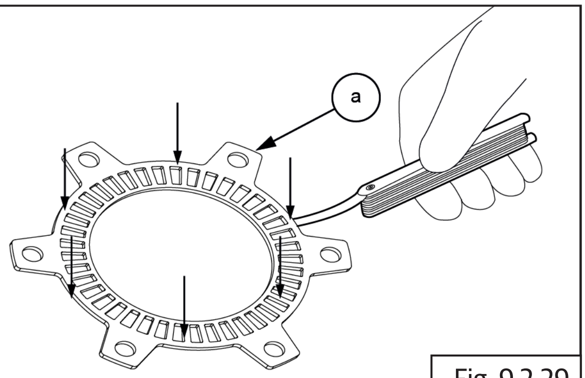


Fig. 9.2.29

Feeler gauge

Standard:	0.00 mm
Service limit:	0.10 mm

- After assembly of brake disc **(a)** into front wheel, insert spindle into rim, fix on wheel balance frame **(b)** and rotate rim to check the disc run-out with dial gauge **(c)**. Ensure run-out is within specified limits.

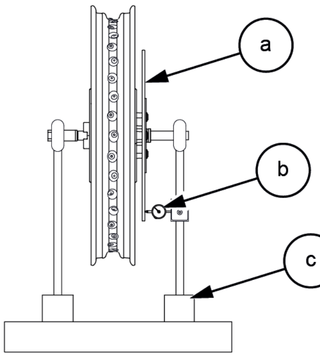


Fig. 9.2.30

Dial gauge

Service limit:	1 mm

⚠ CAUTION

Run-out of brake disc should be checked only when brake disc is assembled on wheel hub.

- Inspect brake pad thickness- front and rear. Replace if worn-out.

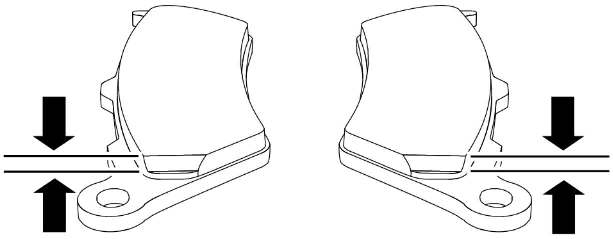


Fig. 9.2.31

- Check brake fluid level and top up if line is below 'MIN' level **(a)**.

Front

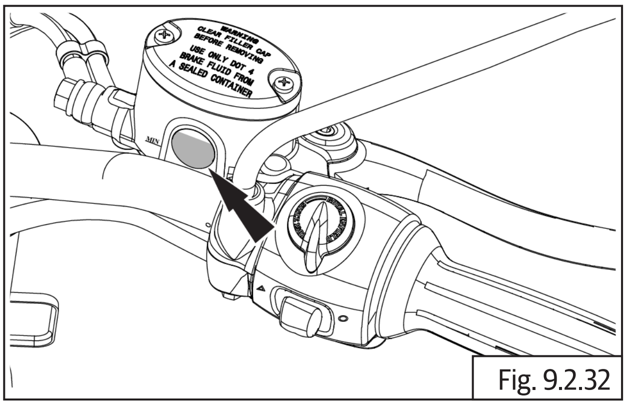

WARNING
CLEAR FILLER CAP
BEFORE REMOVING
USE ONLY DOT 4
BRAKE FLUID FROM
A SEALED CONTAINER
MIN

Fig. 9.2.32

Rear

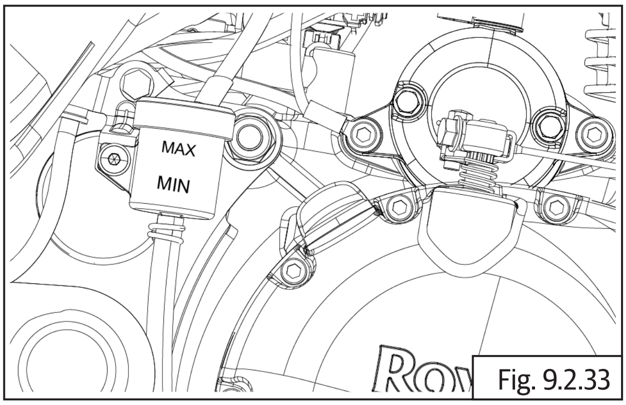


Fig. 9.2.33

⚠ CAUTION

DO NOT mix DOT 4 and other brake fluids together

- Inspect brake lever front **(a)** free play and brake pedal rear free play. If free play is spongy, check brake pads for wear or tear and replace and follow brake bleeding procedure.

Front

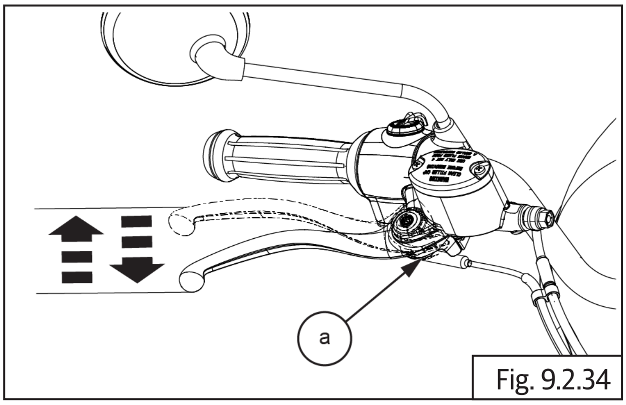


Fig. 9.2.34

Rear

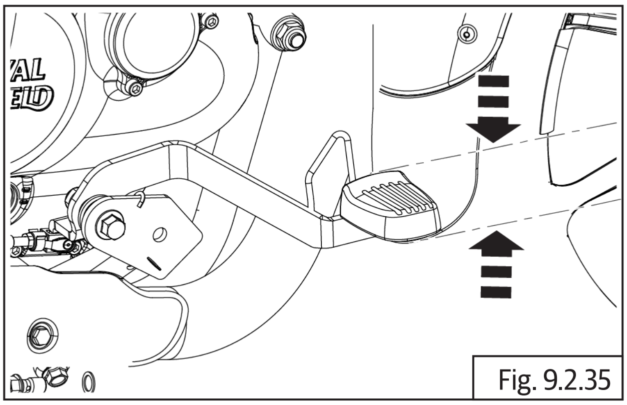


Fig. 9.2.35

- Inspect and replace front and rear brake hoses **(a)** if they have any cracks, leakages or damages.

Front

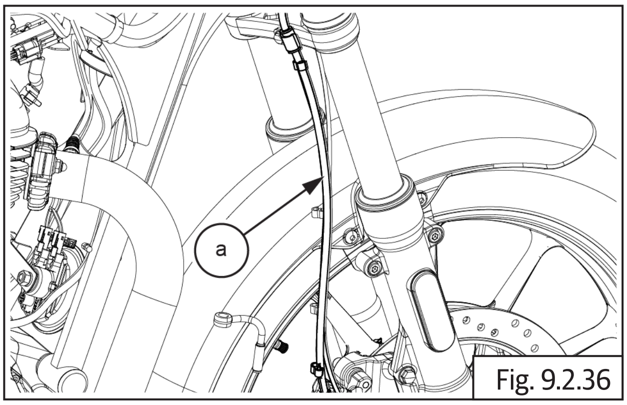


Fig. 9.2.36

Rear

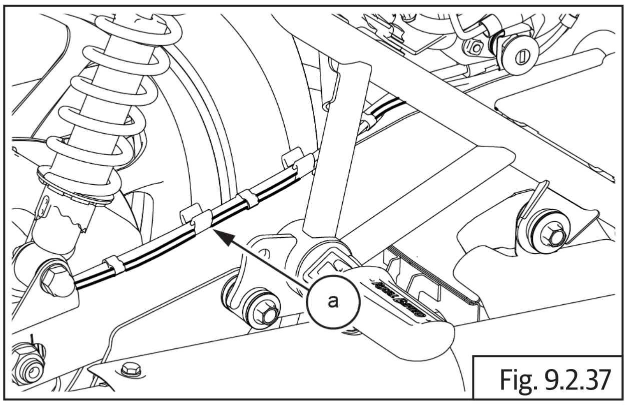


Fig. 9.2.37

Assembly

Brake - Rear

9.2.4. Brake Disc - Rear

- Assemble rear disc plate **(a)** into rear wheel hub RH **(b)**.

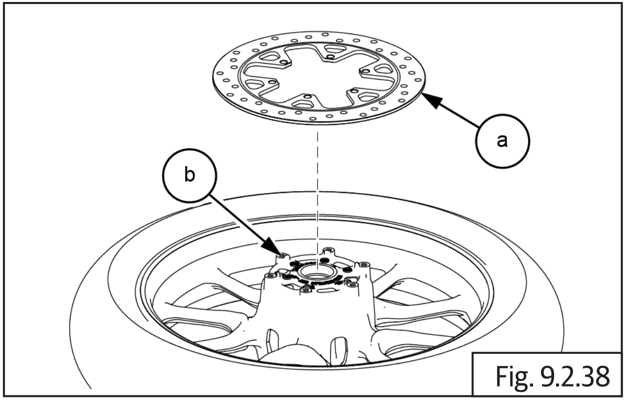


Fig. 9.2.38

- Assemble ABS toner **(a)** into rear wheel hub RH.

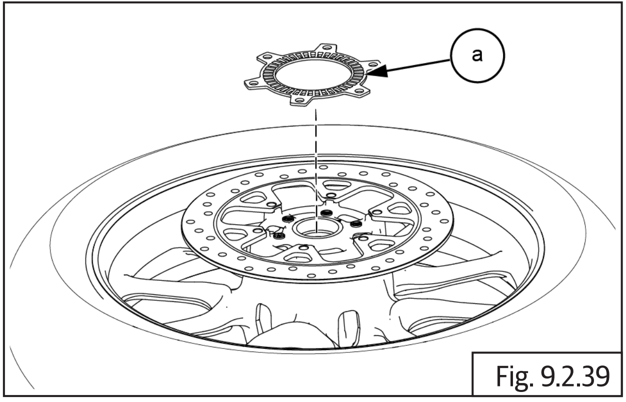


Fig. 9.2.39

- Insert and tighten 6 Nos. Hex head nut **(M8)** **(a)** into rear wheel disc hub RH **(b)**.

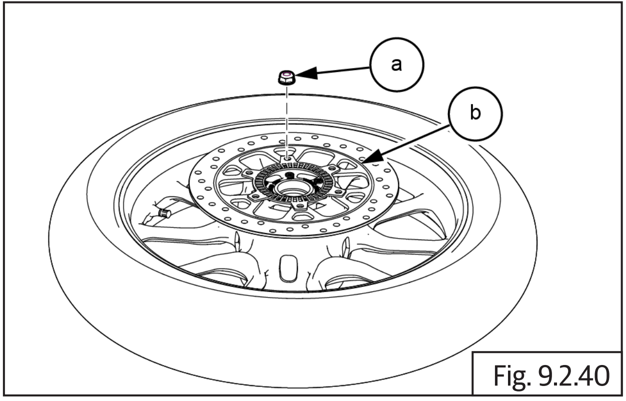


Fig. 9.2.40

🔧	5 mm Allen socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Assemble drive chain and rear wheel into swing arms (section 6.8.8).

9.2.5. Brake Caliper Assembly - Rear

Assembling Rear Brake Caliper

- Coat fresh brake fluid on new dust seals and piston seals.
- Install piston seals in the inner groove **(a)** and dust seals in the outer groove **(b)** in the bore in caliper assembly.

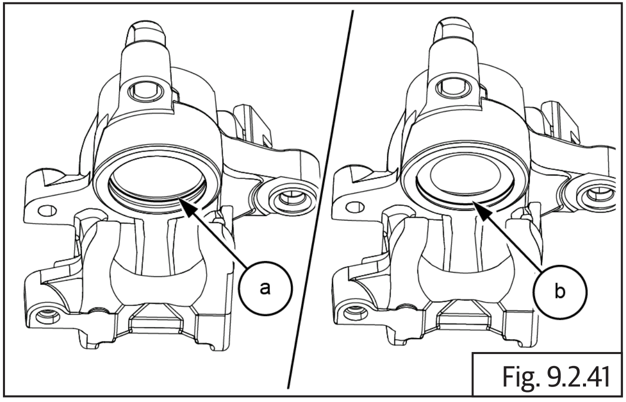


Fig. 9.2.41

- Coat the caliper cylinder and piston with fresh brake fluid.
- Insert the closed end of the piston **(a)** into the caliper bore and gently press it into caliper fully till the open ends of the piston are flush with the caliper bore outer edge

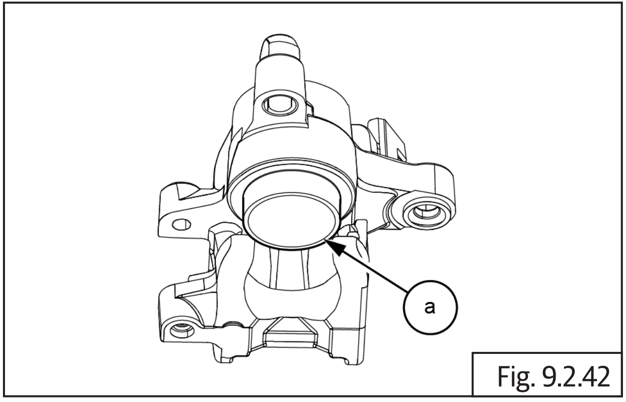


Fig. 9.2.42

⚠ CAUTION

DO NOT apply force while assembling the piston into the caliper. Press only with minimal hand pressure.

- Assemble the rubber grommets **(a)** on the bracket mounting area of the caliper.

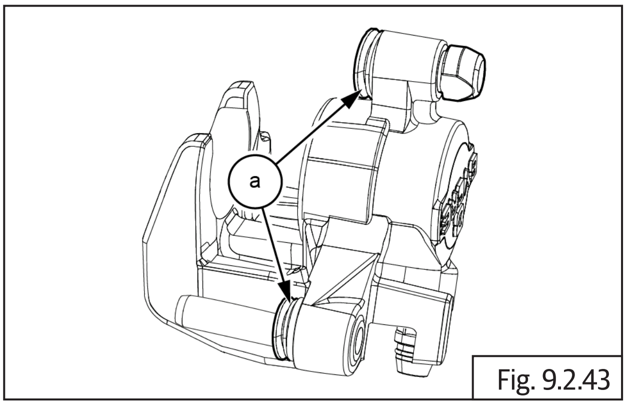


Fig. 9.2.43

- Locate bracket **(a)** on the caliper **(b)** and gently press caliper into bracket fully.

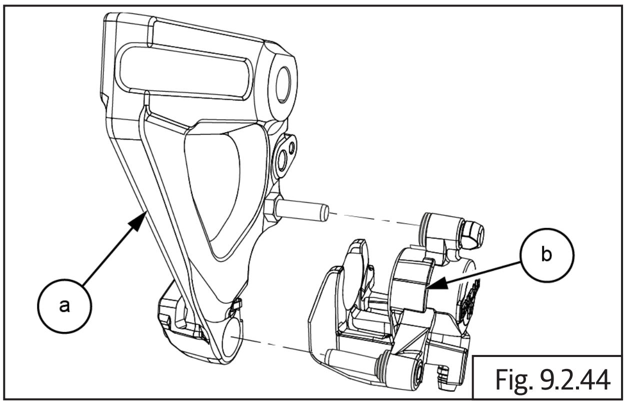


Fig. 9.2.44

- Install the pad tension spring plate **(a)** in the Caliper body.

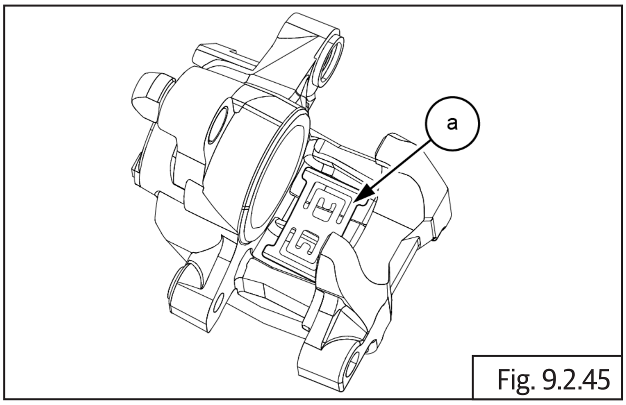


Fig. 9.2.45

- Assemble Bleed screw **(a)** with the dust cap on the caliper body.

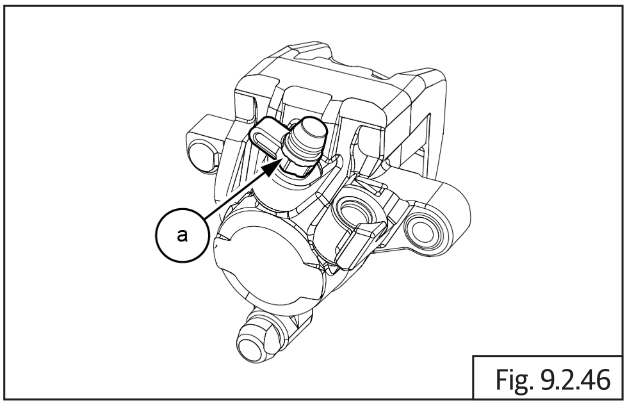


Fig. 9.2.46

- Gently locate brake caliper **(a)** with holder onto brake disc.

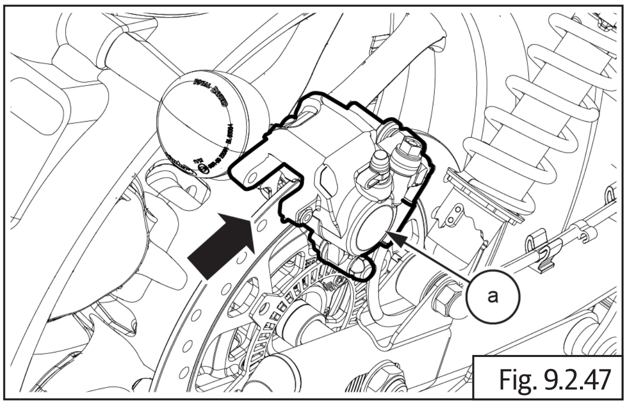


Fig. 9.2.47

Rear Brake Pads in Wheel Caliper

- Gently locate brake pads **(a)** into brake caliper.

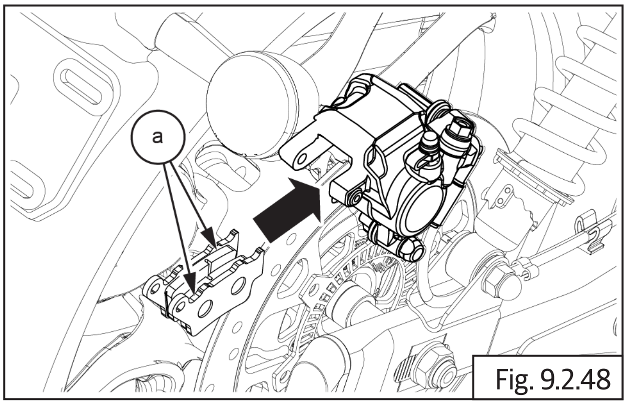


Fig. 9.2.48

- Locate brake pad lock pin **(a)** into brake caliper.

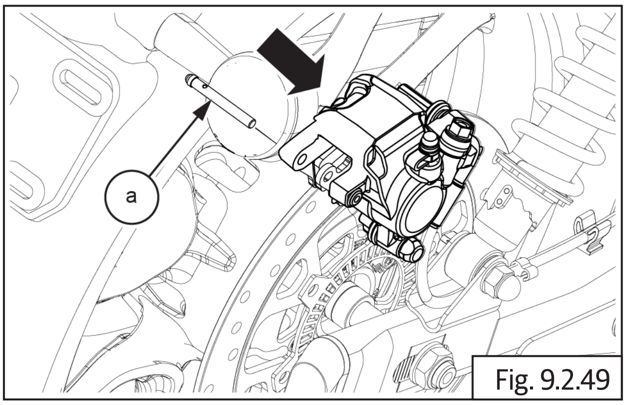


Fig. 9.2.49

- Install brake pad inner clip **(a)** into brake pad lock pin.

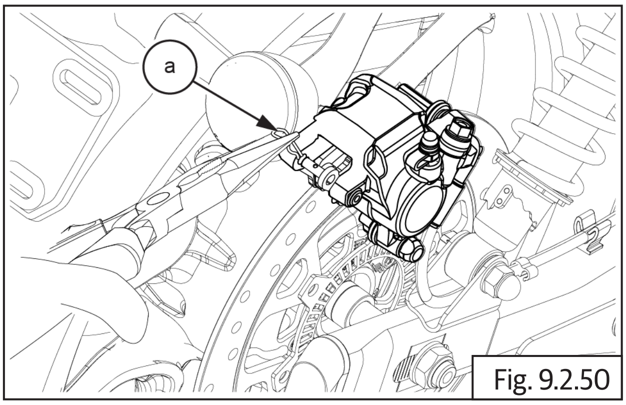


Fig. 9.2.50

🔧	Nose plier

- Gently assemble rear wheel speed sensor ABS **(a)** into rear wheel hub.

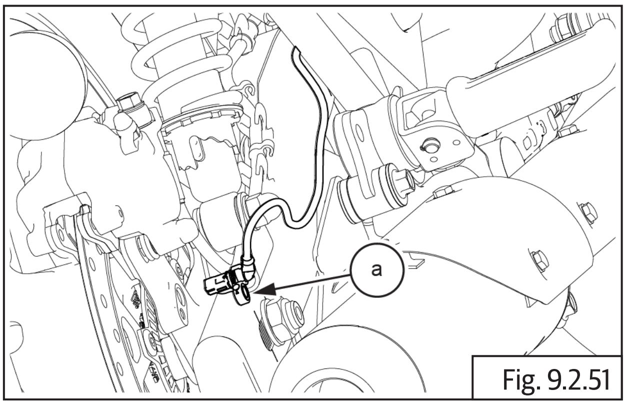


Fig. 9.2.51

- Locate and tighten Hex socket head screw **(M5)** **(a)** located below brake caliper on rear wheel RH.

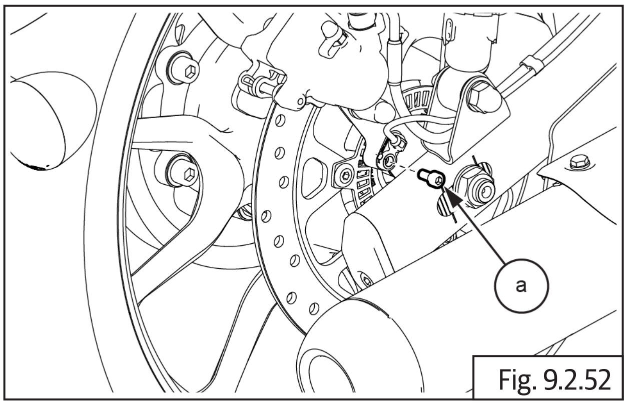


Fig. 9.2.52

🔧	5 mm Allen socket with Ratchet
Torque	10-12 N-m/1.0-1.2 kgf-m

- Assemble swing arm bolt, spindle and chain adjuster assembly into rear wheel (section 6.8.8).

9.2.6. Master Cylinder Assembly - Rear

- Locate new O-ring inside the master cylinder bore.

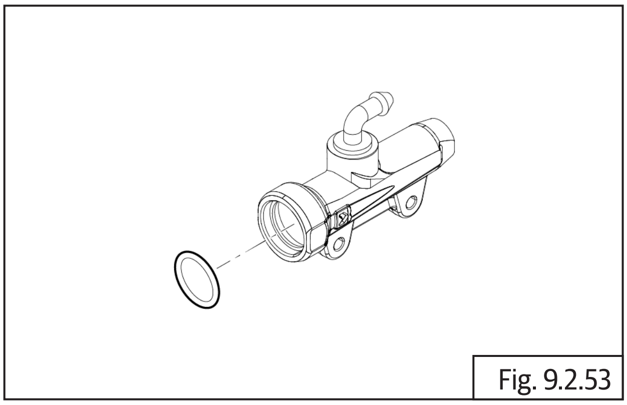


Fig. 9.2.53

⚠ CAUTION

DO NOT use any sharp tool to assemble the O ring or piston in the master cylinder.

- Assemble spring guide on the small end of spring.
- Locate peg on piston, on spring guide.
- Locate large bush over the piston.
- Insert large end of the spring along with the piston and guide bush into the master cylinder bore and hold it in compressed position inside master cylinder.
- Assemble Circlip **(a)** in the master cylinder body **(b)** and ensure it is locked properly in the groove.

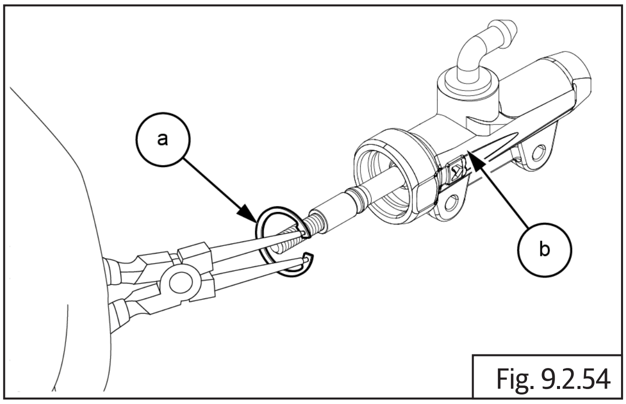


Fig. 9.2.54

🔧	Circlip plier

- Assemble the protective rubber boot **(a)** on the master cylinder.

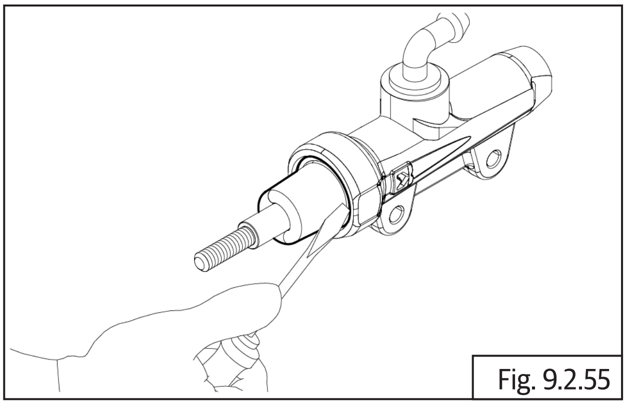


Fig. 9.2.55

🔧	Screw driver

- Locate master cylinder assembly into frame assembly.
- Insert and tighten 2 Nos. Hex socket bolts **(M6)** **(a)** to fix master cylinder assembly **(b)** into frame.

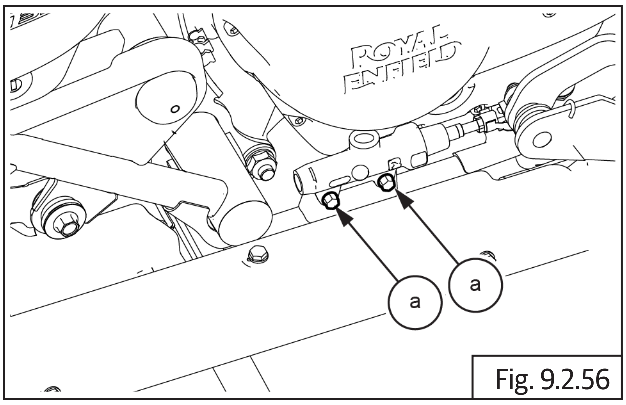


Fig. 9.2.56

🔧	10 mm socket with Ratchet
Torque	10-12 N-m/1 kgf-m

- Assemble banjo bolt **(a)** along with copper washer **(b)** and brake hose **(c)** in the master cylinder assembly.

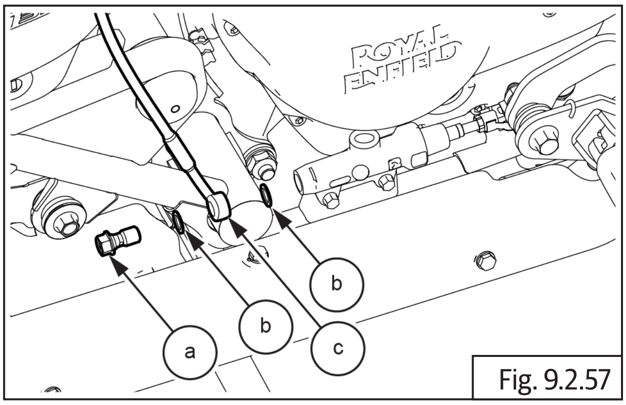


Fig. 9.2.57

🔧	12 mm Allen socket with Ratchet
Torque	10-12 N-m/1 kgf-m

- Locate and assemble rear brake fluid reservoir **(b)** with allen bolt **(a)** .

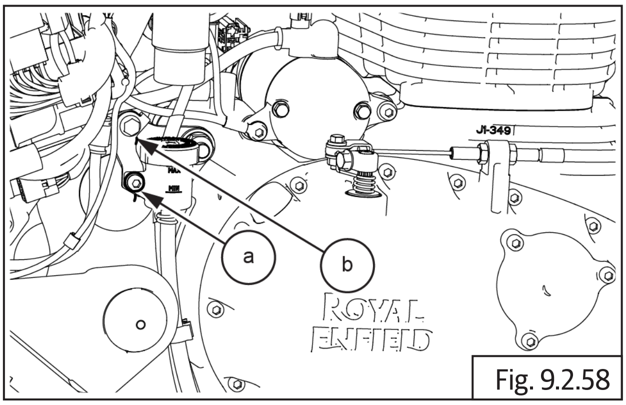

J1-349
a
b
ROYAL ENFIELD

Fig. 9.2.58

🔧	8 mm socket with Ratchet
Torque (a)	3 N-m/0.3 kgf-m

🔧	10 mm socket with Ratchet
Torque (b)	10 N-m/1.0 kgf-m

- Assemble reservoir hose **(a)** in the master cylinder assembly.

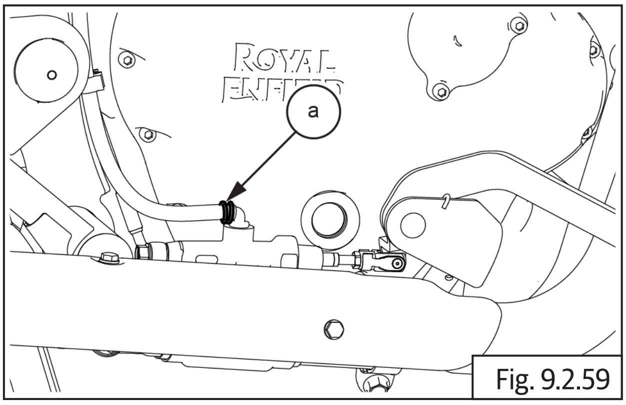

ROYAL ENFIELD
a

Fig. 9.2.59

🔧	Nose Plier

Rear Brake pedal

- Insert the rear end of the brake pedal **(a)** into the master cylinder **(b)**.

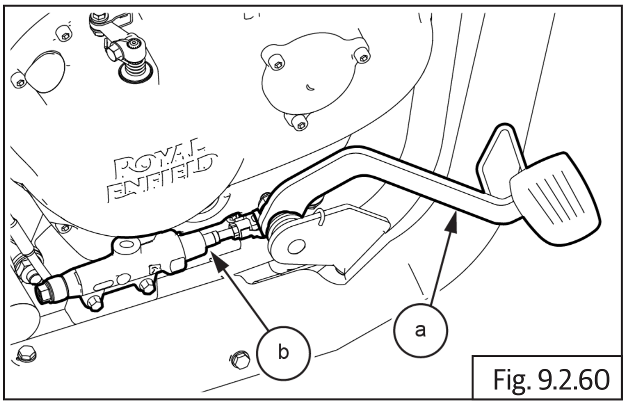

ROYAL ENFIELD
a
b

Fig. 9.2.60

- Locate and tighten brake pedal mounting bolt **(a)** in pedal **(b)**.

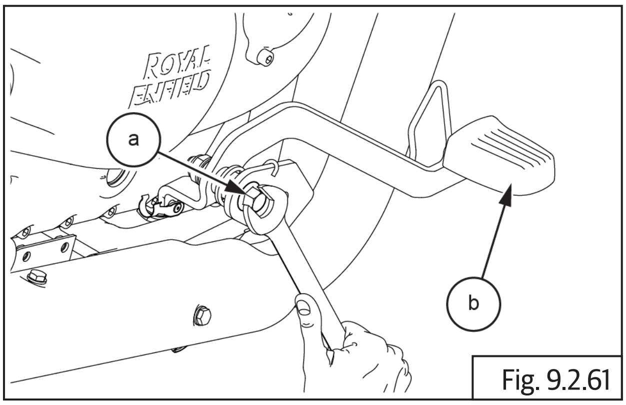

ROYAL ENFIELD
a
b

Fig. 9.2.61

🔧	6 mm Allen socket with Ratchet
Torque	25-35 N-m/2.5-3.5 kgf-m

Brake - Front

9.2.7. Brake Disc - Front

- Locate front brake disc **(a)** on front wheel hub and disc facing outward. Ensure mounting holes are correctly aligned.

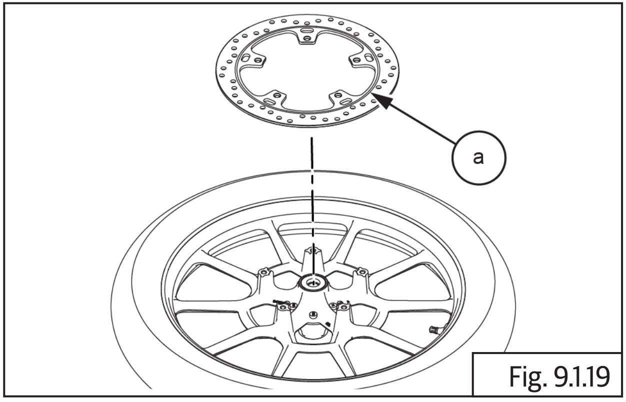


Fig. 9.1.19

- Position toner wheel **(a)** onto front disc and ensure mounting holes are correctly aligned.
- If bolts are pre-coated bolts replace with new ones.
- If they are non-coated, clean threads and wait for few minutes and apply thread sealant.

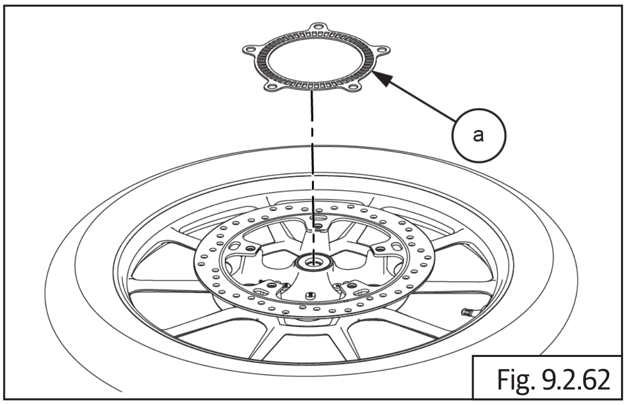


Fig. 9.2.62

- Insert 5 Nos. Hex socket head bolts **(M8) (a)** into brake disc LH and tighten in criss cross pattern to specified torque.

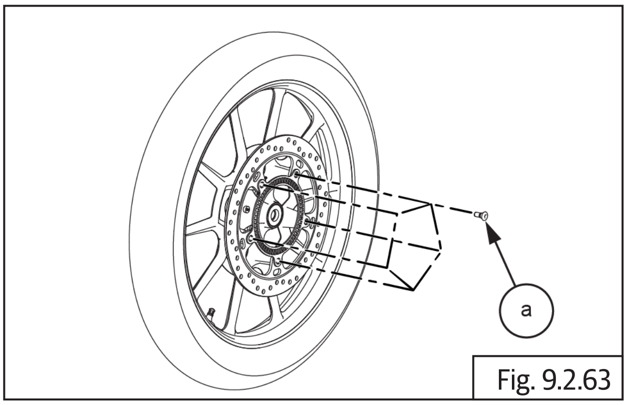


Fig. 9.2.63

🔧	6 mm Allen socket with Ratchet
Torque	25 N-m/2.5 kgf-m

- Assemble front wheel into front fork assembly (section 6.8.13).

9.2.8. Brake Caliper - Front

- Coat fresh brake fluid on new dust seals and piston seals.
- Install piston seals in inner groove **(a)** and dust seals in outer groove **(b)** in the bore in caliper assembly.

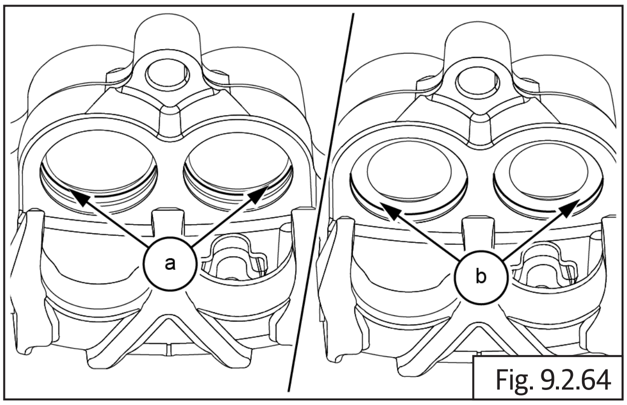


Fig. 9.2.64

- Coat the caliper cylinders and pistons with fresh brake fluid.
- Insert closed end of the pistons into caliper bores and gently press it into caliper fully till open ends of the piston **(a)** are flush with caliper bore outer edge.

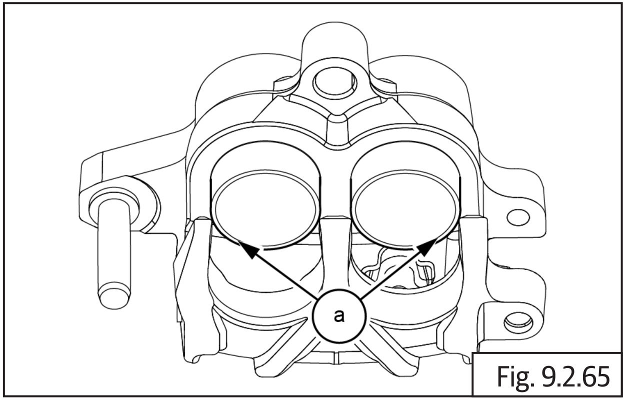


Fig. 9.2.65

NOTE

- *Do not apply force while assembling the pistons into the caliper. Press only with minimal hand pressure. Assemble pistons one at a time into the caliper.*

- Smear white grease on caliper boot and bellow and assemble them on the caliper body.

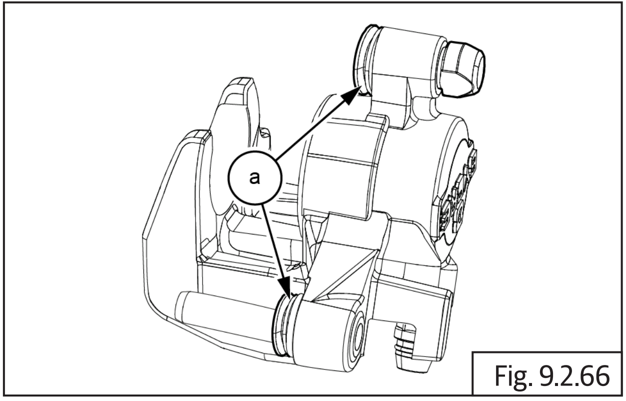


Fig. 9.2.66

- Install pad tension spring plate **(a)** in caliper body.

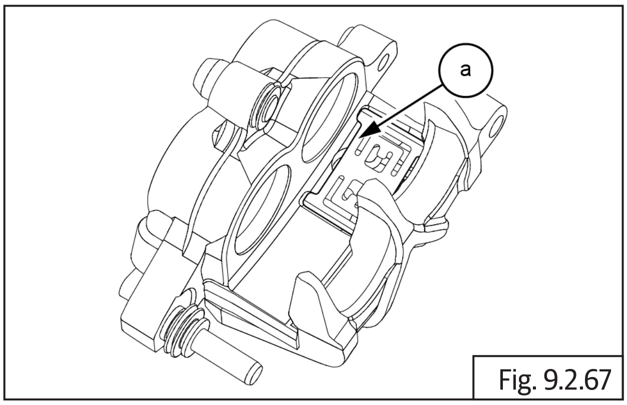


Fig. 9.2.67

- Assemble bleeder valve **(a)** with dust cap on the caliper body.

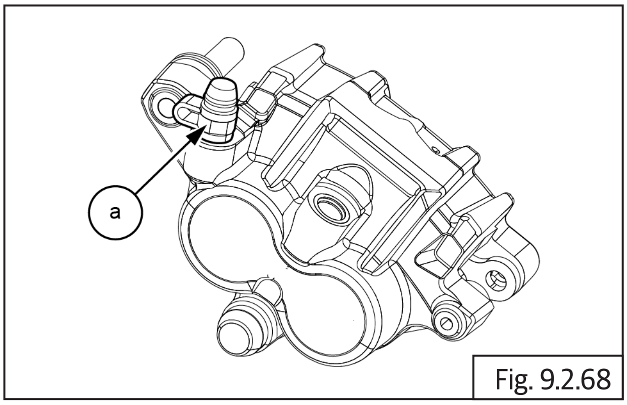


Fig. 9.2.68

- Assemble the mounting bracket **(a)** on caliper body **(b)**.

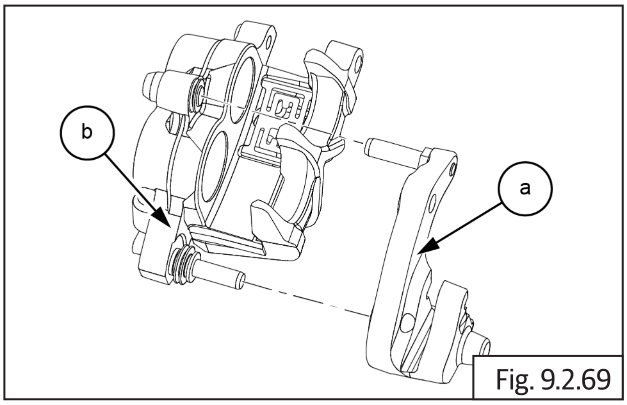


Fig. 9.2.69

- Slide in and assemble brake pads **(a)** into brake caliper **(b)**.

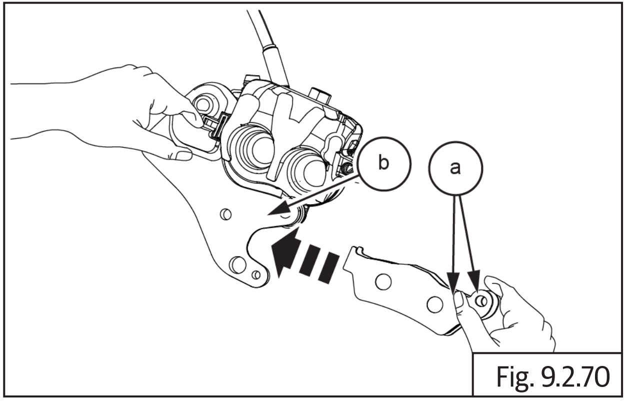


Fig. 9.2.70

- Lubricate and insert brake pad pin **(a)** into caliper.

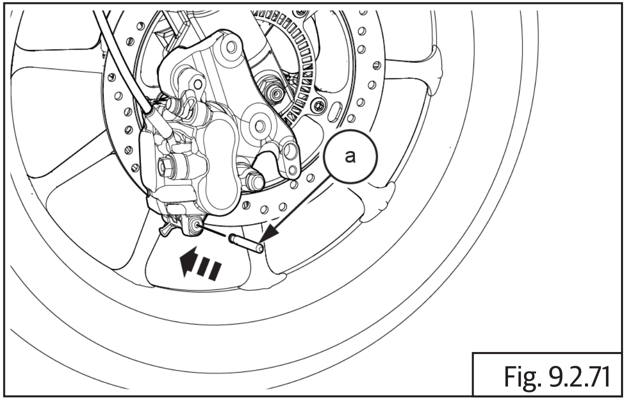


Fig. 9.2.71

- Suitably support caliper and correctly tap brake pad pin **(a)** from outside to inside.

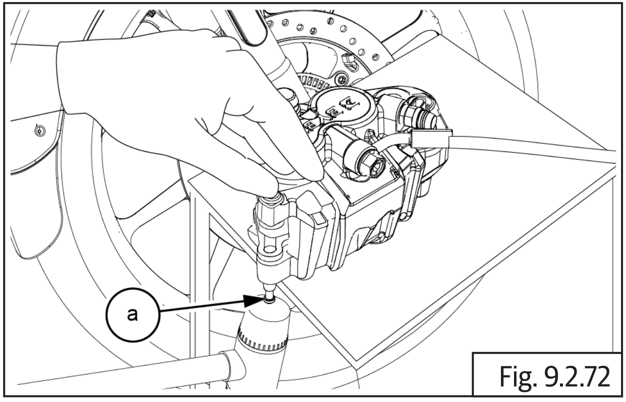


Fig. 9.2.72

🔧	Pin punch and Mallet

- Assemble brake pad lock clip **(a)** into the brake pad pin **(b)**.

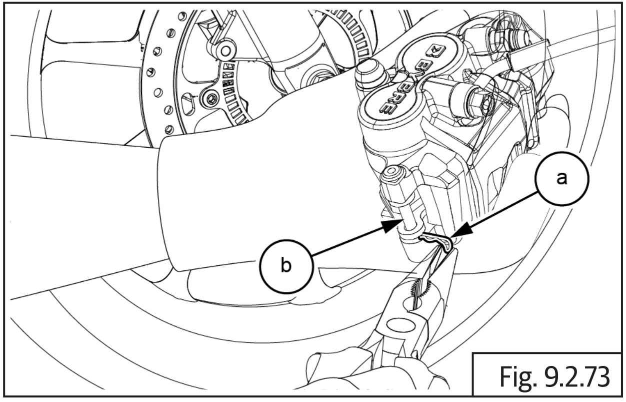


Fig. 9.2.73

🔧	Nose plier

- Support and hold the front brake caliper assembly suitably onto the front RH fork.
- Locate and tighten upper and lower Hex flange head bolts **(M8)** **(a)** to fix front brake caliper assembly **(b)** to RH fork.

NOTE
• *Apply LOCTITE 243 on the threads of the bolt before installing.*

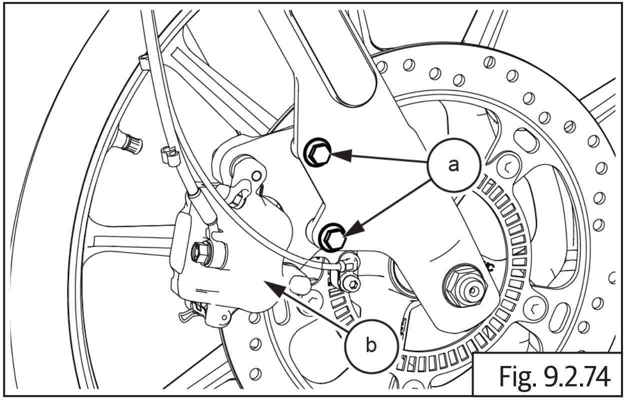


Fig. 9.2.74

🔧	12 mm Socket with Ratchet
Torque	20-30 N-m/2.0-3.0 kgf-m

- Gently install hose into caliper assembly (section 9.3.10).

9.2.9. Master cylinder - Front

- Locate conical spring **(a)** on the piston **(b)**.

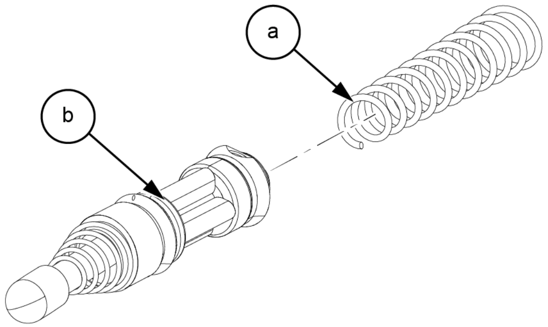


Fig. 9.2.75

- Smear piston seals and cylinder bore with white grease and assemble piston with spring **(a)** subassembly into master cylinder **(b)** by gently pushing it into the bore.

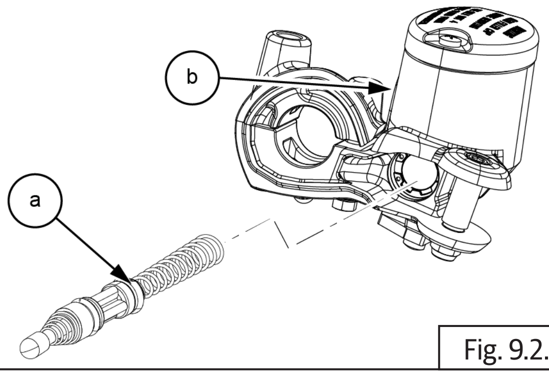


Fig. 9.2.76

- Compress and assemble circlip **(a)** into groove of master cylinder **(b)**.

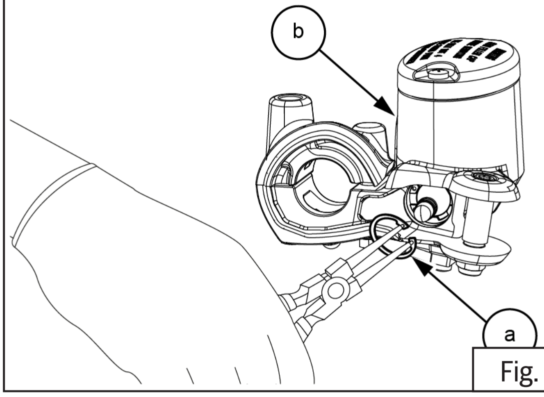


Fig. 9.2.77

🔧	Circlip Plier

⚠ CAUTION

DO NOT use tools with sharp ends.

Ensure circlip is locked properly after assemble.

- Assemble the rubber Boot.

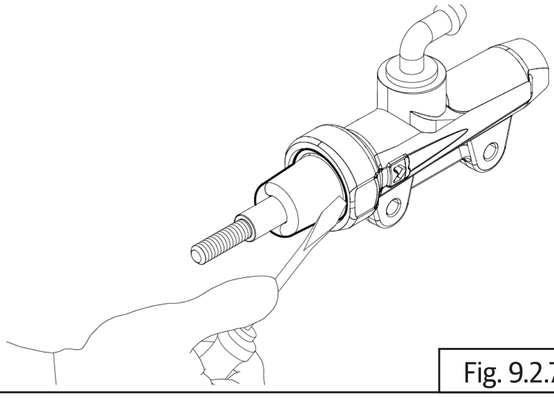


Fig. 9.2.78

🔧	Screw Driver

- Apply silicon grease on the lever pivot hole and on the Piston surface.
- Position brake lever inside the bracket, locate pivot screw **(a)** from the top and tighten to bracket.
- Assemble lock nut below **(b)** and tighten.

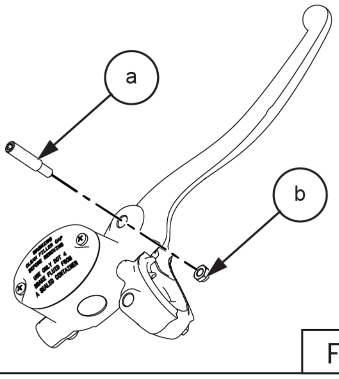


Fig. 9.2.79

🔧	4 mm Allen Socket and 10 mm double end spanner

- Assemble the Brake Switch **(b)** on the bracket **(a)**.

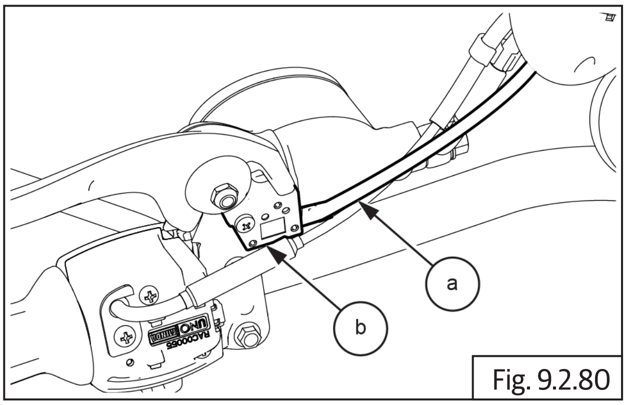


Fig. 9.2.80

- Locate master cylinder assembly on handlebar RH and locate clamp over cylinder.
- Locate and tighten 2 Nos. Hex flange head bolt **(M5) (a)** into clamp and fix the master cylinder assembly.

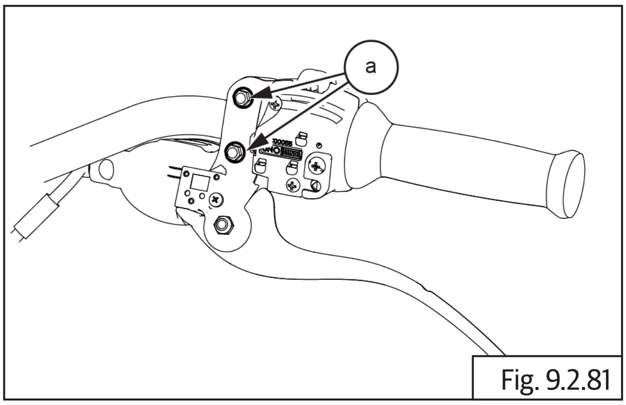


Fig. 9.2.81

	8 mm Socket with Ratchet
Torque	8-10Nm/0.8-1.0 kg/f

- Assemble banjo bolt **(a)** holding the brake hose **(b)** to front master cylinder to ABS modulator **(c)**.

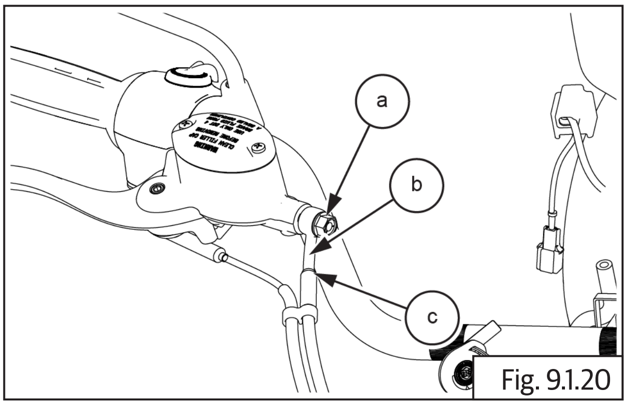


Fig. 9.1.20

	12 mm Socket with Ratchet
Torque	23-26Nm/2.3-2.6 kg/f

- Refill fluid, inspect and diagnose if there are any leakages (section 9.8).

9.3 Anti-lock Braking System (ABS)

Working Principle

The Royal Enfield Meteor 350 motorcycle is equipped with the state of the art Anti-Lock Braking System (ABS).

The ABS is a safety system which constantly receives inputs about the speed of rotation of the front and rear wheels on a real time basis and modulates the braking force for each wheel when brakes are applied by the rider. This helps prevent the brakes from locking the wheels, especially when brakes are applied suddenly, the wheels have a better traction with the road surface.

The benefits of ABS:

- Increased braking efficiency and riding confidence when braking.
- Prevent wheel lock up when brakes are applied suddenly with great force thereby ensuring good traction of the front and rear wheels with the road surface.

Typical Motorcycle Braking Distance

The ABS consists of an Electronic Control Unit (ECU), modulator, toner rings and wheel speed sensors.

The ECU constantly receives inputs on the speed of rotation of the front and rear wheels through the wheel speed sensors. When the rider applies either the front or rear brakes or both brakes, the speed sensors provide data on the rate of deceleration of the wheels to the ECU which then commands the valves in the modulator to progressively regulate the hydraulic fluid pressure on a real time basis so that the brake pads do not “lock” on the brake disc which can potentially cause the wheels to lock.

Whenever front and/or rear brakes are applied with great force/suddenly, the braking management system gets input of the wheels speed through a wheel speed sensor and commands the modulator in the braking system to modulate the hydraulic fluid force such that the brake pads do not lock on the brake disc which effectively from locking and provide better traction to prevent the motor cycle from shifting and/or loss of control.

In the ABS, during application of brakes, a pulsating sensation will be felt on the brake lever/pedal indicating that the ABS is working correctly.

⚠ WARNING

The ABS will by no means prevent an accident and/or loss of control. It is the responsibility of the rider to anticipate and judge the braking distances required, depending on the speed at which the motorcycle is traveling and apply brakes sufficiently in advance to prevent an accident and/or loss of control.

While ABS assists in improved motorcycle control during braking, decreased stopping distances on dry and good road conditions, it cannot be assumed that it will be effective in wet, rainy, snow covered, off road conditions, loose gravel surfaces or hilly roads etc, as the traction of the wheel itself will be very minimal in these conditions.

As far as possible, whenever applying sudden brakes in emergency in wet conditions, please ensure the motorcycle is upright in steady riding position and the handlebars are straight. Avoid hard braking when banking heavily at great speeds.

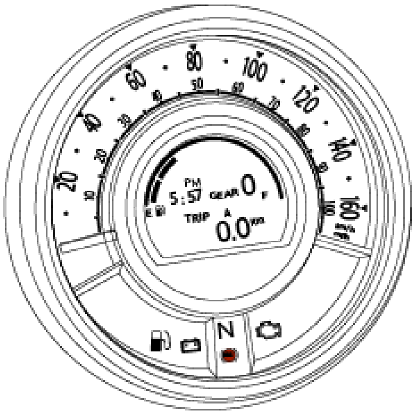
Whenever brakes are applied, a pulsating sensation will be felt on the brake lever/pedal. This is characteristic to the ABS and quite normal, as the modulator in the ABS constantly modulates the hydraulic pressure in the braking system in relation to the force applied on the brake lever/pedal and the speed of the motorcycle.

Whenever bleeding the hydraulic system, it is highly recommended to bleed both the front and rear brakes for proper functioning of the ABS. Do not restrict to bleeding any one brake system as it may render the ABS non-functional, in case the other brake has air bubbles in its system.

Functions and Specifications of the ABS Aggregates

As soon as the ignition and engine stop switch are switched ON, the ABS sign will light up. The lamp will remain ON till the motorcycle attains a speed of 5 Kmph (3MPH) and then switches OFF. This indicates that the ABS is working properly.

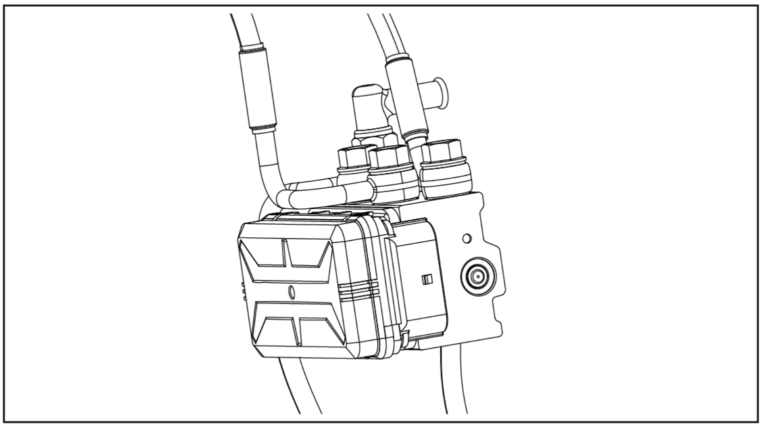
In the event the lamp does not switch OFF and remains continuously ON at higher speeds, it is recommended not to drive the motorcycle and get the brake system inspected and corrected through a nearest authorized Royal Enfield Dealer / Distributor.



1. Electronic Control Unit (ECU) with Moduator

The ECU is located in the bracket alongside of the modulator, on the frame, behind the battery.

It consists of a microprocessor, which receives inputs from the wheel speed sensors, interprets the data, determines the safe hydraulic pressure in relation to the speed of the wheels and commands the valves in the modulator to progressively regulate the hydraulic fluid pressure on a real time basis for efficient and safe braking.



The ECU also records and stores data on the performance of the ABS on a real-time basis. This will help in diagnosing any braking related disorders, whenever the Royal Enfield NACS II diagnostic tool is connected to the socket in the wiring harness of the motorcycle.

The history stored in the ECU can also be saved to an external computer for future reference and also erased from the ECU, using the Royal Enfield NACS II diagnostic tool.

The modulator is located on the frame below the fuel tank. The brake hoses from the master cylinders and brake calipers are connected to the modulator.

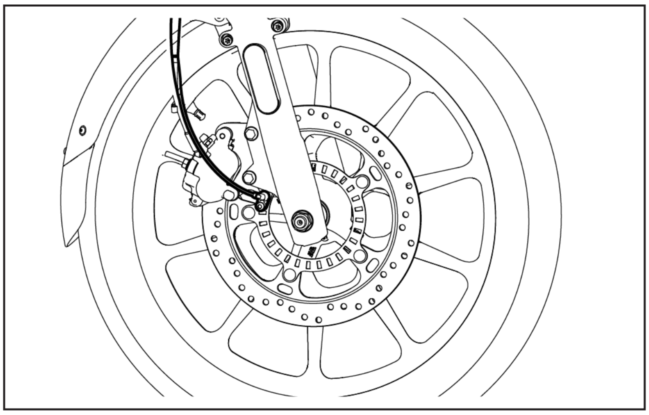
Whenever brakes are applied, the valves inside the modulator are progressively activated by the ECU to regulate the hydraulic fluid pressure in the brake system. This in turn will modulate the movement of the pistons inside the brake calipers to prevent the brake pads from locking on the brake discs.

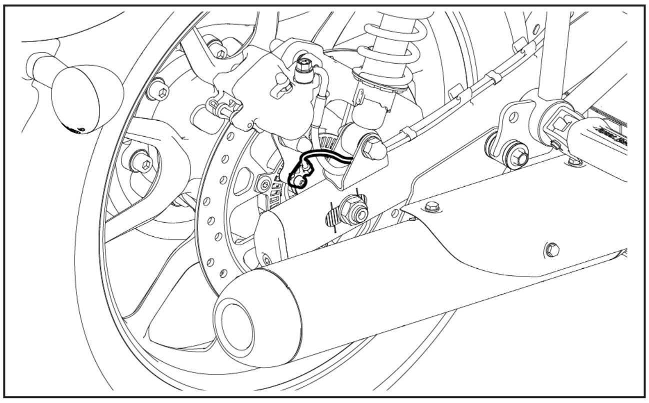
2. Wheel Speed Sensors, Front and Rear

There are 2 wheel speed sensors provided in the motorcycle. The front speed sensor is assembled on the fork end LH and the rear speed sensor is assembled on the rear wheel caliper bracket.

Specifications:

Operating Voltage:	08 V to 16 V
Operating Temperature:	–40º C to 150º C

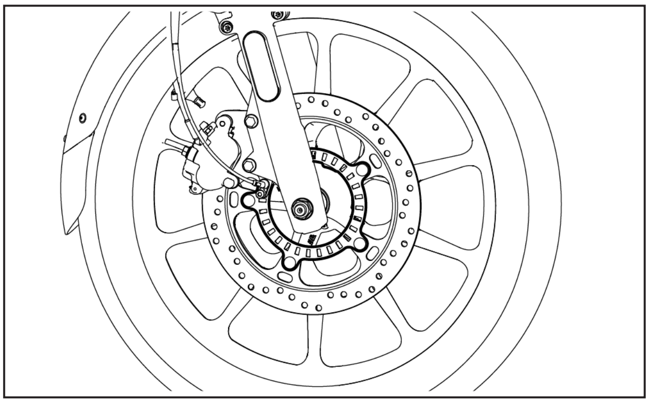


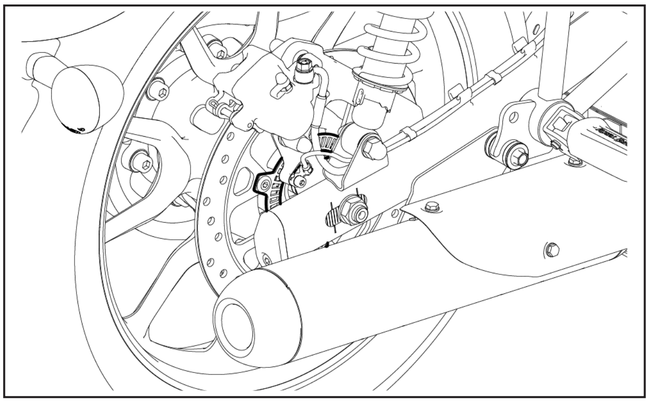


These sensors provide the inputs to the ECU about the speed of rotation of the wheels.

3. Toner Rings, Front and Rear

The toner rings are assembled on the front and rear brake hubs inside the brake discs.

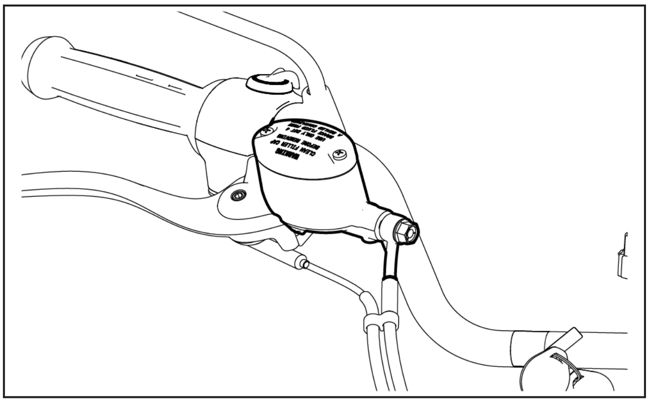


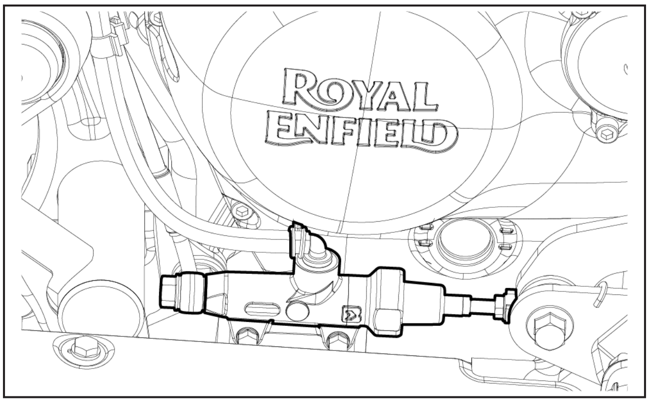


The toner rings assists the wheel speed sensors to assess the speed of rotation of the wheels.

4. Master Cylinders, Front and Rear

The front brake master cylinder is assembled on the handlebar RH and activated by the front brake lever.
The rear brake master cylinder is assembled on the frame RH side and activated by the brake pedal



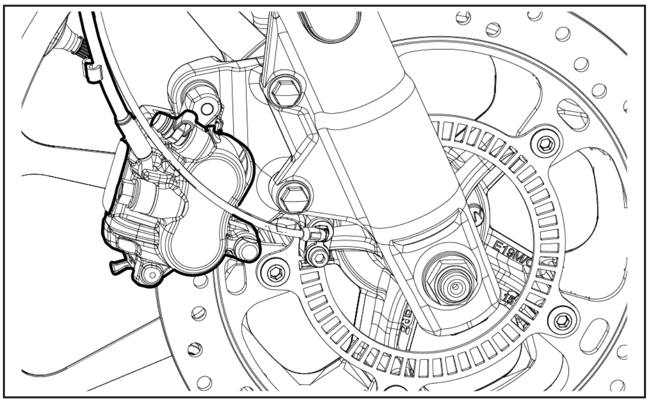


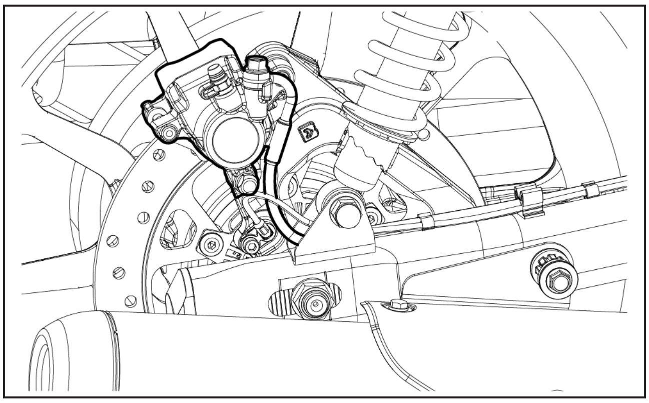
Whenever the front brake lever/rear brake pedal are activated, the piston inside the master cylinder applies force on the brake fluid to activate the brakes.

The master cylinders are connected to the modulator through brake hoses to transmit the applied hydraulic fluid pressure from the master cylinders.

5. Wheel Calipers - Front and Rear

The front wheel caliper is assembled on the fork end RH and the rear wheel caliper is located on the rear swing arm RH. The wheel calipers consist of pistons and brake pads.





When brakes are applied, the hydraulic fluid force in the braking system causes the pistons to move, and pushes the brake pads against the brake discs on the wheels for braking.

The wheel calipers are connected to the modulator which modulate the hydraulic fluid force to be applied against the pistons.

Do's and Don'ts for ABS

- **Use only approved Brake fluid recommended by Royal Enfield. (DOT4)**
- **Whenever the modulator is removed from the motorcycle, please ensure it is stored upright with the ports facing upwards.**
- **Whenever the modulator is removed from the motorcycle for any reason, please ensure the front and rear brake system bleeding is carefully done and no air is trapped in the brake system.**
- **DO NOT interchange ABS unit/ECU from one motorcycle to another.**
- **DO NOT interchange the brake hose connections between master cylinders and wheel cylinders and also front and rear circuit, at the modulator end.**
- **The shelf life of a wet modulator unit is 5 years from the date of manufacture.**

Dismantling

9.3.1. Modulator

⚠ CAUTION

Before dismantling the modulator, ensure ignition switch and engine stop switch are in OFF position.

Ensure the hydraulic brake fluid from the front and rear brakes is drained completely.

- **Remove the following parts:**
    - Side panel RH (section 6.7.1).
    - Rider seat (section 6.7.2).
    - Fuel tank assembly (section 7.1.15).

⚠ CAUTION

Ensure the following:

Fuel is drained completely from fuel tank.

Fuel feed and return hoses are disconnected from the fuel rail.

Wiring couplers to fuel pump and low fuel sensors are disconnected.

EVAP hose pipes are disconnected.

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

- Bleed out the brake fluid from the front brake system (section 9.4).

⚠ CAUTION

Do not spill brake fluid on any part of the motorcycle as it will damage the painted/ plastic surfaces.

⚠ WARNING

Ensure brake fluid does not get in contact with eyes and skin. In-case of exposure wash affected area thoroughly with water. Seek medical attention immediately if any irritation persists.

Keep out of reach of children.

Dispose drained brake fluid carefully and responsibly.

- Loosen and remove banjo bolt **(a)** and disconnect hose **(b)** from front caliper on front fork RH.

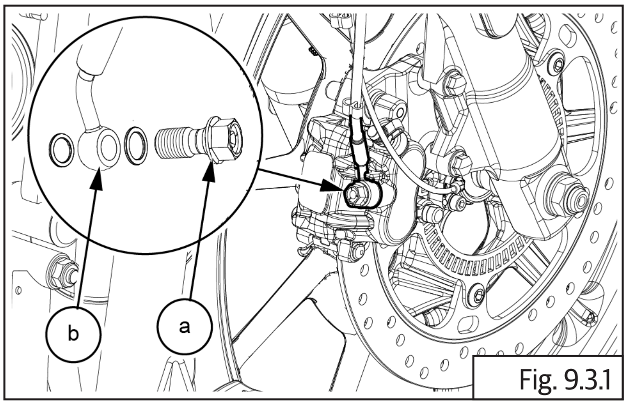


Fig. 9.3.1

12 mm Ring spanner

- Loosen and remove banjo bolt **(a)** and disconnect hose **(b)** from front master cylinder on handlebar RH.

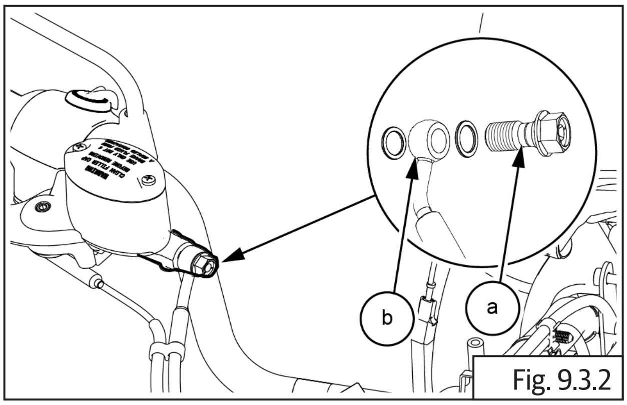


Fig. 9.3.2

12 mm Ring spanner

- Loosen and remove banjo bolt **(a)** and disconnect hose **(b)** from rear caliper from rear wheel RH.

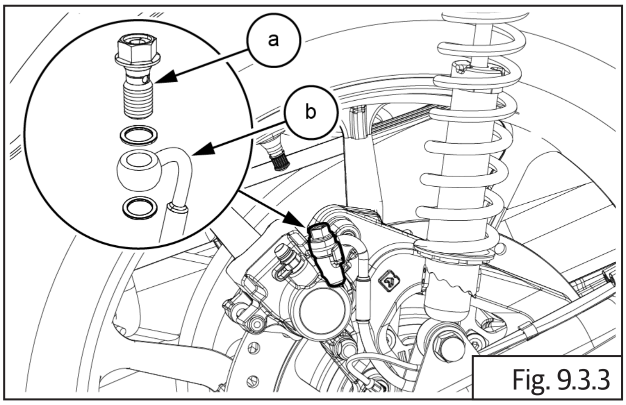


Fig. 9.3.3

	12 mm Ring spanner

- Loosen and remove banjo bolt **(a)** and disconnect hose **(b)** from rear master cylinder assembly.

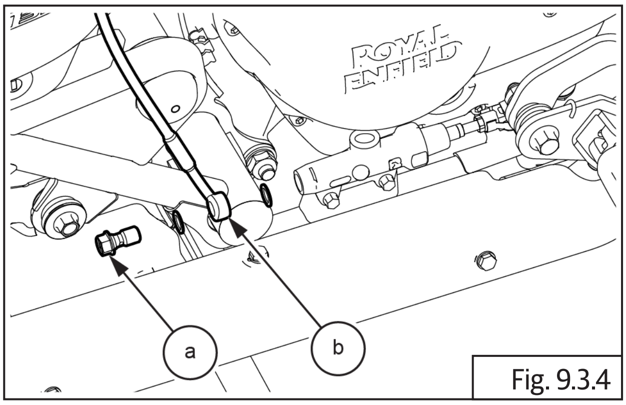


Fig. 9.3.4

	12 mm Ring spanner

- Disconnect holding straps **(a)** of the brake hoses to the frame/fork end/swing arm.

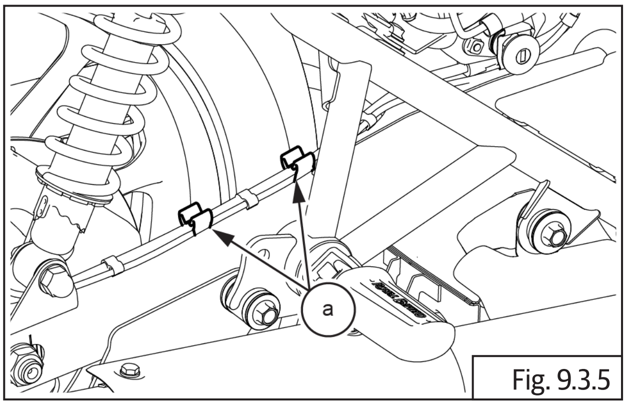


Fig. 9.3.5

- Disconnect ABS modulator electrical connector **(a)** from ECU.

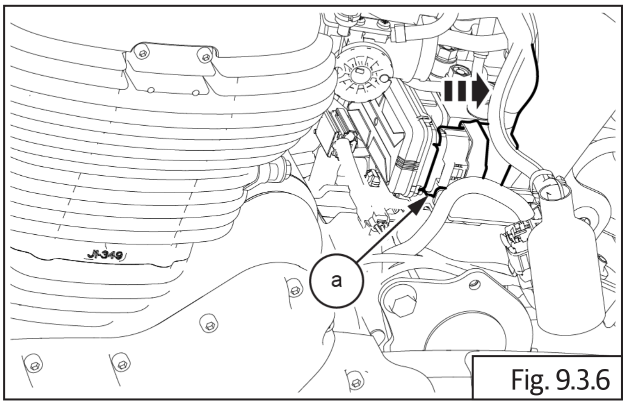


Fig. 9.3.6

- **Remove the following parts:**
  - Air filter box (section 6.7.1).
  - Battery tray infill (section 6.7.2).
- Loosen and remove 2 Nos. Hex head screws **(M6)** **(a)** holding ABS modulator mounting bracket from frame.
- Ensure all 4 Nos. brake hoses are free to be removed along with modulator from frame.

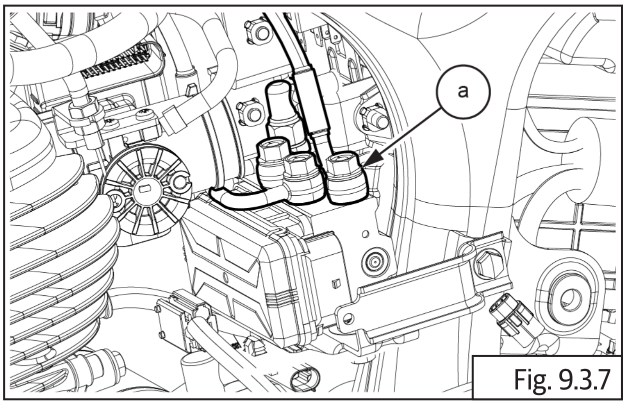


Fig. 9.3.7

- Loosen and remove 2 Nos hex bolt **(M6) (a)** at the LH and RH of the bracket .

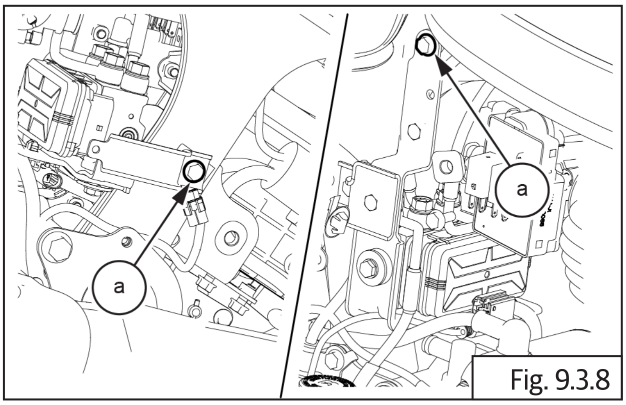


Fig. 9.3.8

	10 mm Socket with Ratchet

- Loosen and remove 2 Nos hex bolt **(M6) (a)** at the bottom of the bracket **(b)**.

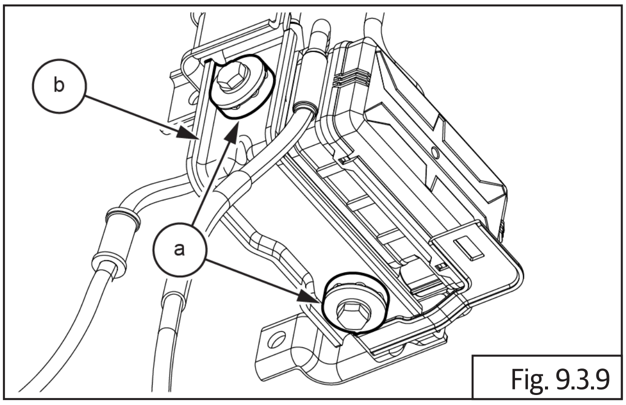


Fig. 9.3.9

	10 mm Socket with Ratchet

- Separate the ABS modulator **(a)** from bracket **(b)** and remove along with the 4 Nos. brake hoses.

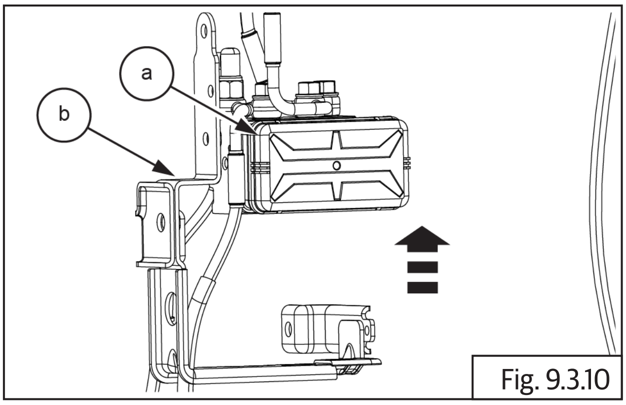


Fig. 9.3.10

- Brake hose tags:
  - a)BLUE-1100731-FrontMaster Cylinder Assembly
  - b) GREEN-1100730-Front Brake Caliper
  - c) RED-1100691-Rear Brake Caliper
  - d)YELLOW-1100732-RearMasterCylinder Assembly

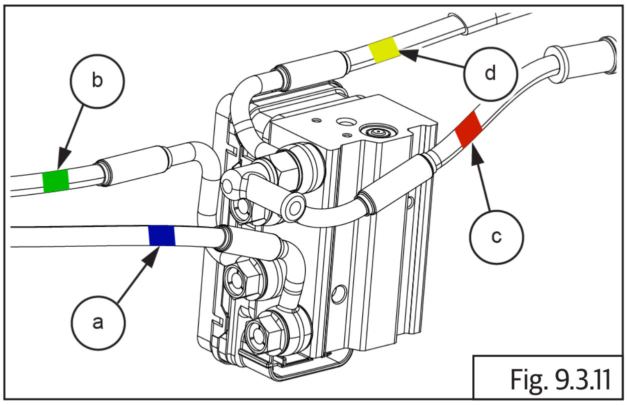


Fig. 9.3.11

- Reference mark to be created during dismantling for ease of assembly.

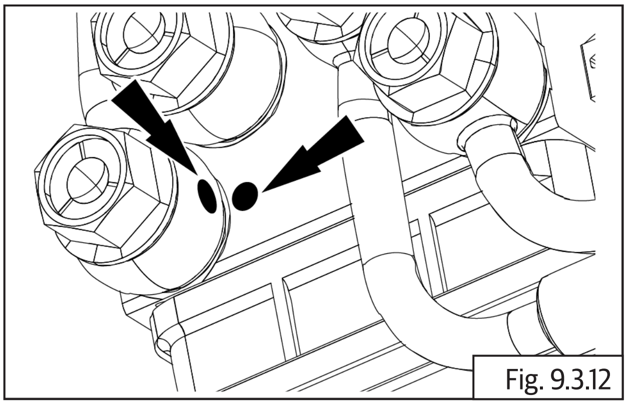


Fig. 9.3.12

- Repeat the above process to other brake hoses.
- Support modulator suitably on a work table, loosen and remove 4 Nos. banjo bolts **(a)** along with washers from modulator to remove brake hoses **(b)**.
- Remove 4 Nos. brake hoses from modulator.

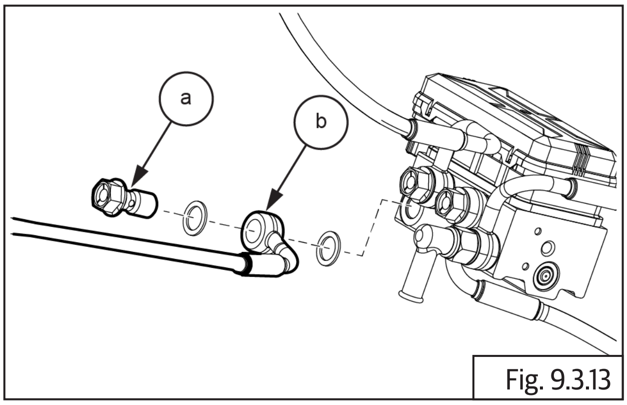


Fig. 9.3.13

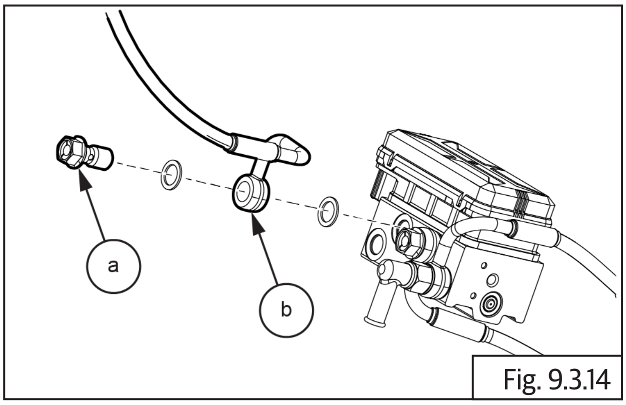


Fig. 9.3.14

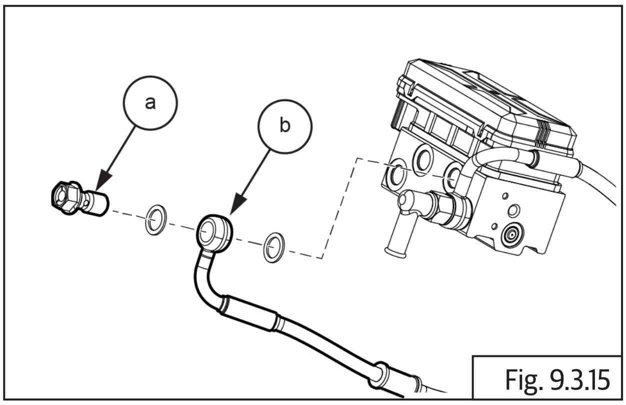


Fig. 9.3.15

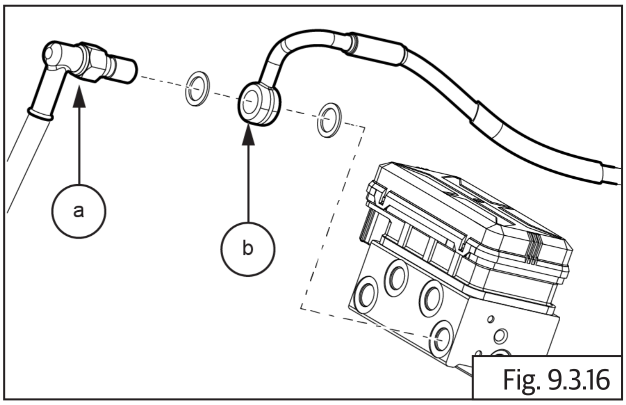


Fig. 9.3.16

Do's & Don'ts

- **DO NOT interchange ABS unit/ECU from one motorcycle to another.**
- **Whenever the modulator is removed from the motorcycle, please ensure it is stored upright with the ports facing upwards.**
- **Store the ECU in a cool and dry place.**
- **Store the ECU away from any magnetic forces as it will affect the ECU program software and damage the ECU.**
- **DO NOT allow moisture to affect ECU.**.

9.3.2. Wheel Speed Sensor - Front

- Ensure Ignition switch and Engine stop switch are in OFF position.
- Release sensor coupler wire from the brake hose clip **(a)** on fork end RH.

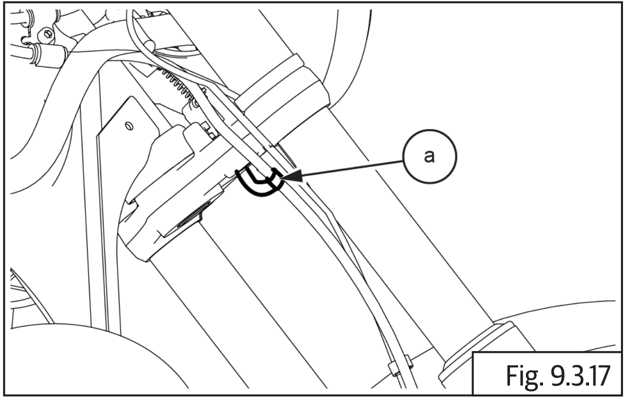


Fig. 9.3.17

- Disconnect sensor coupler **(a)** from harness..

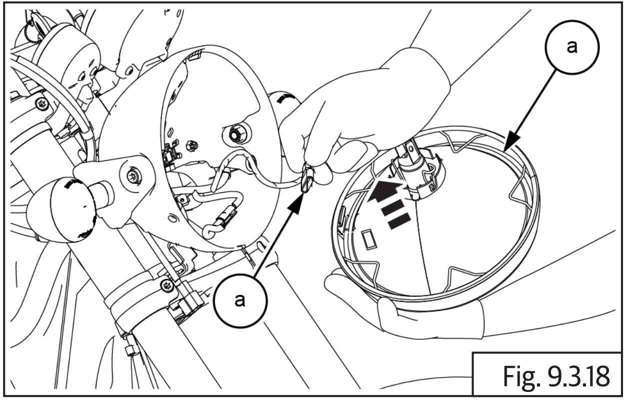


Fig. 9.3.18

- Loosen and remove hex socket head bolt **(M6) (a)** holding sensor **(b)** to fork end RH.
- Gently pull out sensor from fork end RH.

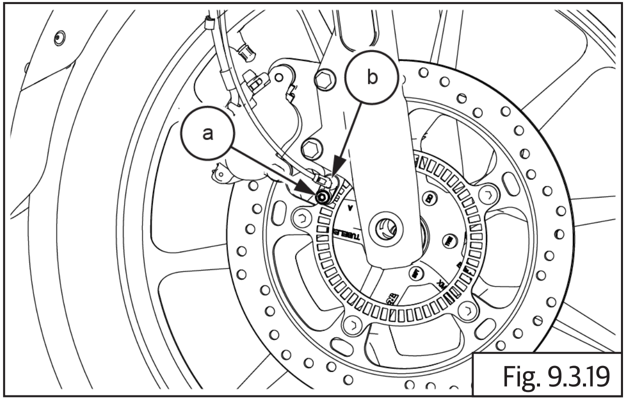


Fig. 9.3.19

🔧	5 mm Allen socket with Ratchet

9.3.3. Wheel Speed Sensor - Rear

- Ensure Ignition switch and Engine stop switch are in OFF position.
- Remove the following parts:
  - Side panel RH (section 6.7.1).
  - Rider seat (section 6.7.2).
  - Disconnect battery terminals and remove battery from battery carrier (section 11.5.1).
- Disconnect sensor coupler **(a)** from ABS modulator.

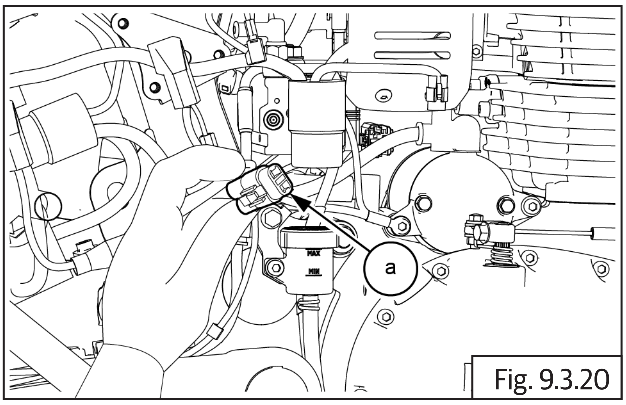


Fig. 9.3.20

- Release sensor coupler wire from the routing in mudguard **(a)** and brake hose clip on swing arm RH.

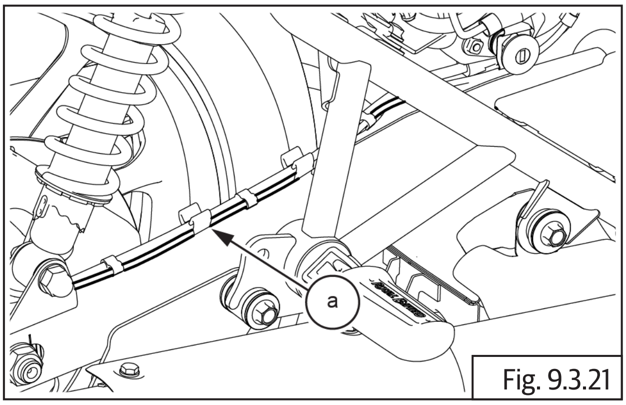


Fig. 9.3.21

- Loosen and remove hex flange head bolt **(M6) (a)** holding sensor **(b)** to rear wheel caliper bracket top.

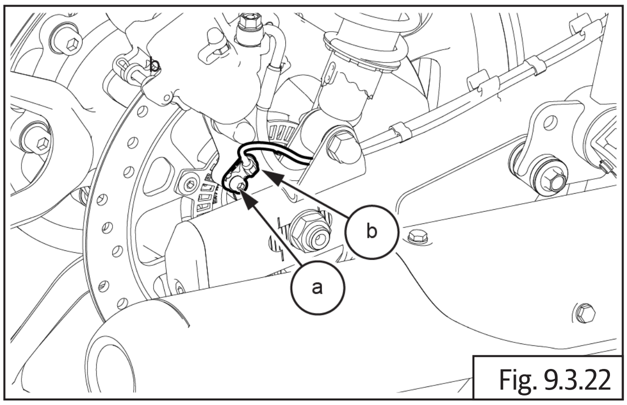


Fig. 9.3.22

🔧	5 mm Allen socket with Ratchet

- Loosen and remove rear shock absorber RH, bottom mounting hex socket head bolt **(a)** and release shock absorber from swing arm (section 6.9.5).

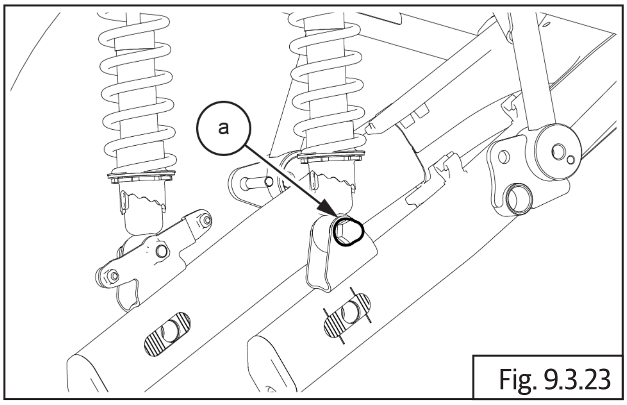


Fig. 9.3.23

- Gently pull out sensor **(a)** from rear wheel caliper bracket top.

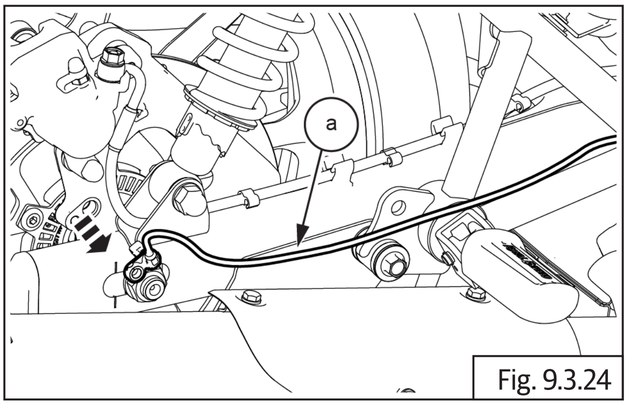


Fig. 9.3.24

9.3.4. Toner Ring - Front

- Refer front wheel removal (section 6.8.2).

9.3.5. Toner Ring -Rear

- Refer rear wheel removal (section 6.8.4).

Assembly

9.3.6. Toner Ring - Front

- Refer front wheel assembly (section 6.8.12).

9.3.7. Toner Ring -Rear

- Refer rear wheel assembly (section 6.8.8).

9.3.8. Wheel Speed Sensor - Rear

- Gently locate sensor **(a)** into rear wheel caliper bracket top.

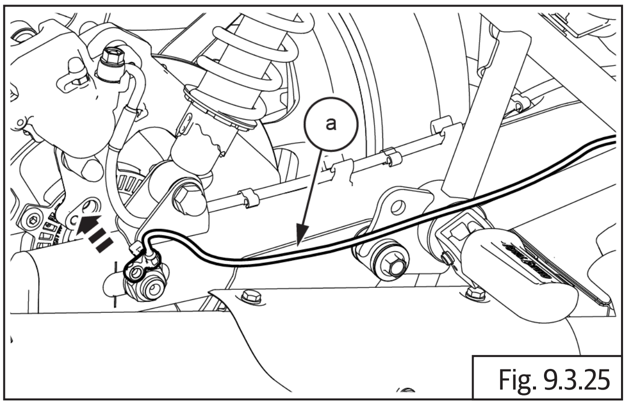


Fig. 9.3.25

- Locate and tighten hex flange head bolt **(M6) (a)** holding sensor **(b)** to rear wheel caliper bracket top.

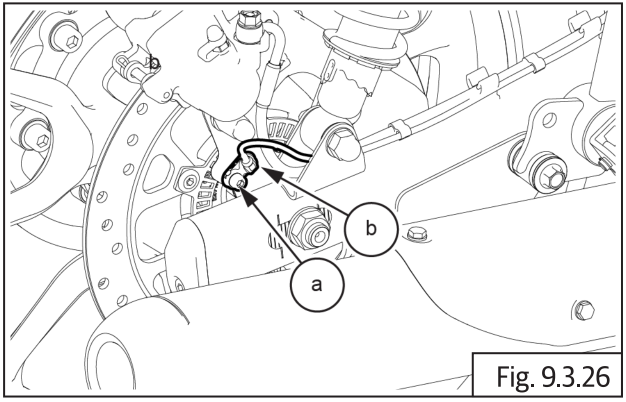


Fig. 9.3.26

🔧	5 mm Allen socket with Ratchet
Torque	10 N-m/1.0 kgf-m

- After assembling wheel speed sensor, check air gap with feeler guage.

Air Gap - 0.38 to 1.7 mm

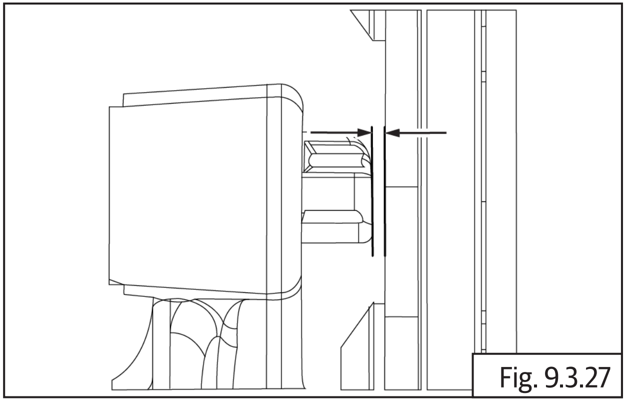


Fig. 9.3.27

- Route sensor cable inside shock absorber mounting bracket.
- Locate and tighten rear shock absorber RH, bottom mounting hex socket head bolt **(a)** and assemble shock absorber into swing arm (section 6.9.13).

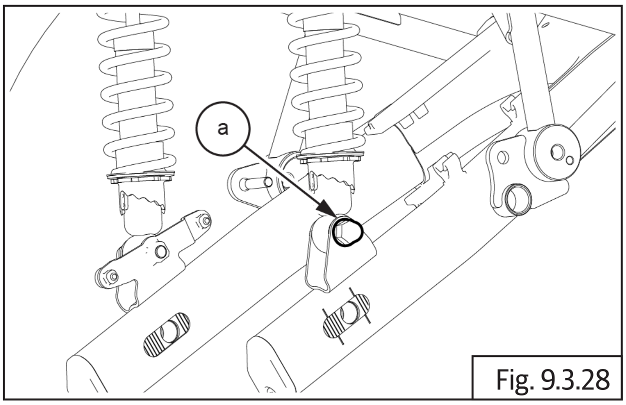


Fig. 9.3.28

- Connect sensor coupler **(a)**.

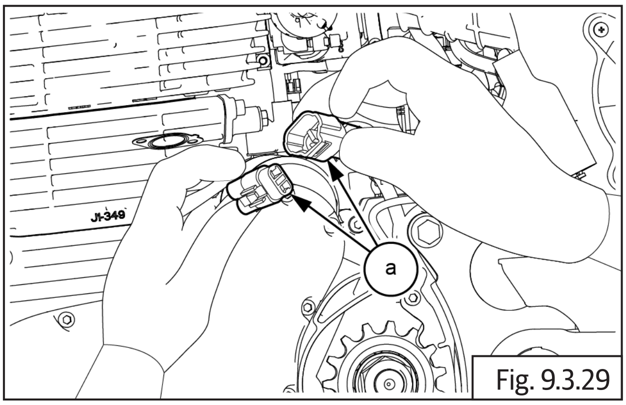


Fig. 9.3.29

- Locate battery into battery tray (section 11.8.3) and connect battery terminals (section 11.8.4).
- Assemble the following
  - Side panel RH (section 6.7.8).
  - Rider seat (section 6.7.7).

9.3.9. Wheel Speed Sensor - Front

- Gently locate sensor onto fork end RH.
- Locate and tighten hex flange bolt **(M6) (a)** holding sensor **(b)** to fork end RH.

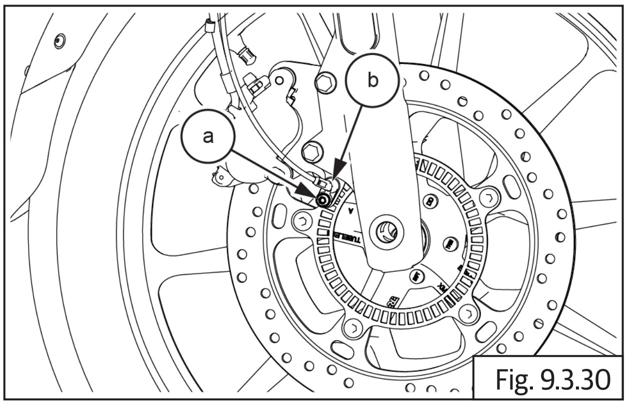


Fig. 9.3.30

🔧	5 mm Allen socket with Torque Wrench
Torque	10 N-m/1.0 kgf-m

- After assembling wheel speed sensor, check air gap with feeler guage.

Air Gap - 0.26 to 1.68 mm

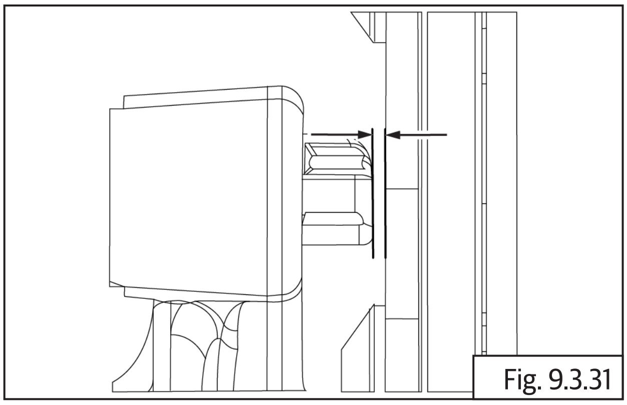


Fig. 9.3.31

- Locate sensor coupler wire into clip **(a)** on fork end RH.

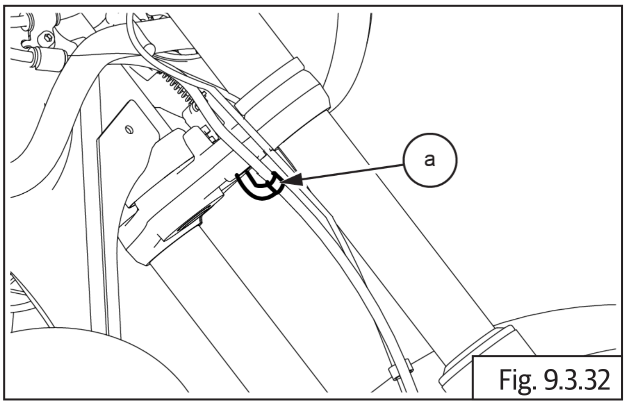


Fig. 9.3.32

	10 mm Socket with Torque Wrench
Torque	10 N-m/1.0 kgf-m

- Connect sensor coupler **(a)** into harness.

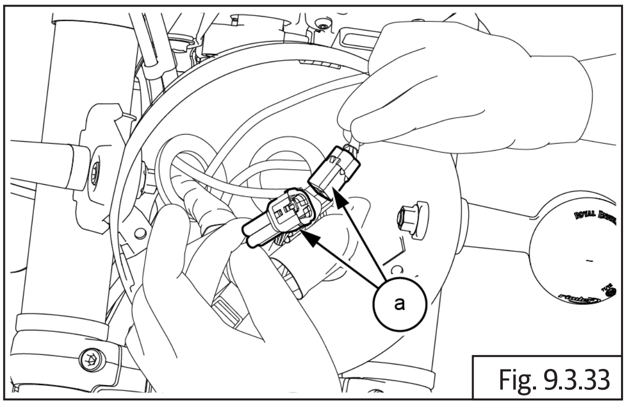


Fig. 9.3.33

⚠ WARNING

DO NOT interchange ABS unit/ECU from one motorcycle to another.

9.3.10. Modulator

- Brake hose color tags:
  - a) BLUE-1100731-Front Master Cylinder Assembly
  - b) GREEN-1100730-Front Brake Caliper
  - c) RED-1100691-Rear Brake Caliper
  - d) YELLOW-1100732-Rear Master Cylinder Assembly
- Ensure the sequence of the hoses is as per the color tags shown below.

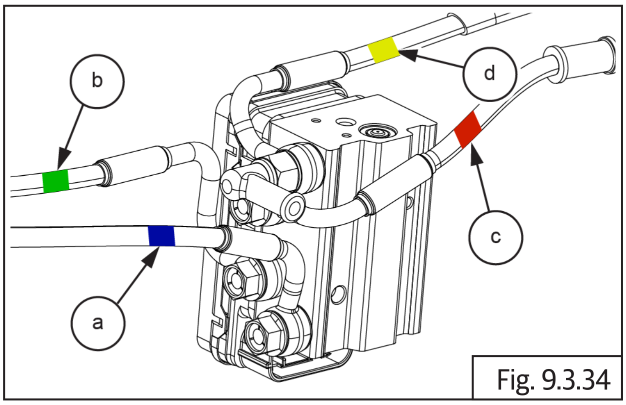


Fig. 9.3.34

- Locate 4 Nos. brake hoses into modulator.
- Support modulator suitably on a work table, keeping the color tags in mind, locate and tighten 4 Nos. banjo bolts along with washers into modulator to fix brake hoses**.**
- Ensure the reference marks to align properly.

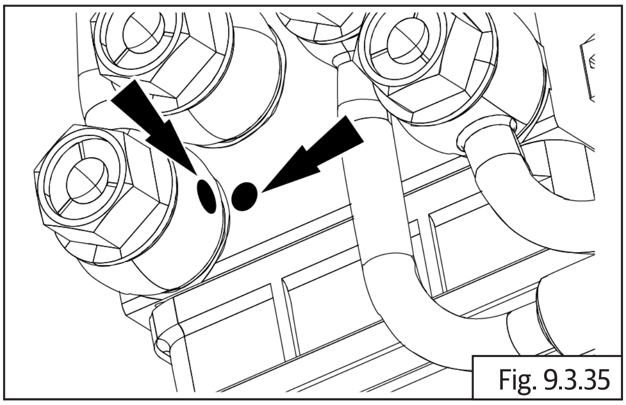


Fig. 9.3.35

- Repeat the above process to other brake hoses.
- RED - Modulator to rear brake caliper hose along with brake light switch.

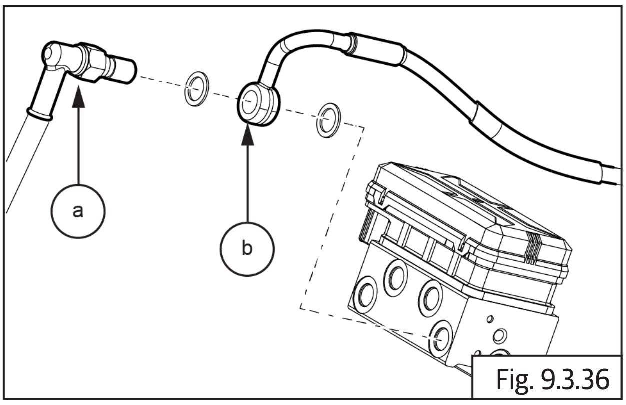


Fig. 9.3.36

🔧	12 mm open end spanner
Torque	23-26 N-m/2.3-2.6 kgf-m

- YELLOW - Modulator to rear master cylinder assembly hose.

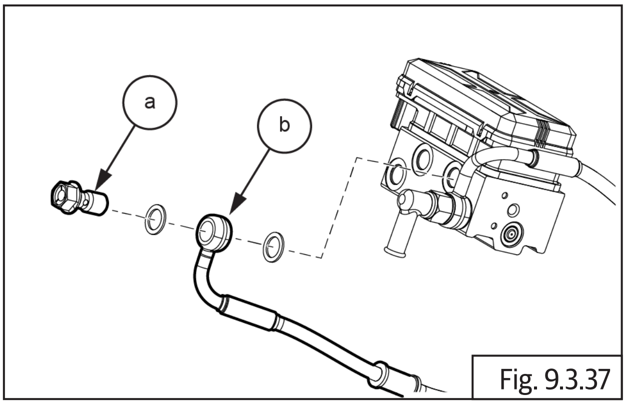


Fig. 9.3.37

🔧	12 mm Socket with Torque Wrench
Torque	23-26 N-m/2.3-2.6 kgf-m

- GREEN - Modulator to front brake caliper hose.

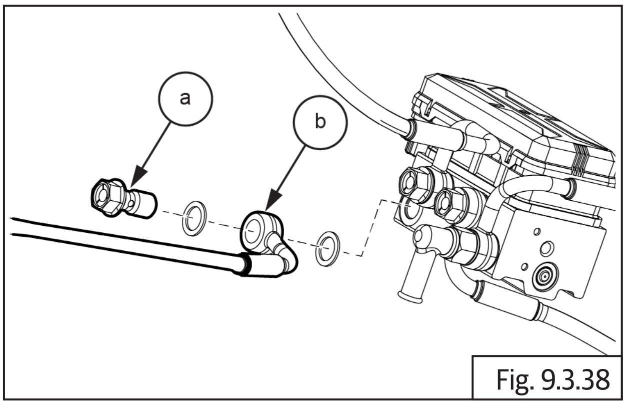


Fig. 9.3.38

🔧	12 mm Socket with Torque Wrench
Torque	23-26 N-m/2.3-2.6 kgf-m

- BLUE - Modulator to front master cylinder assembly hose.

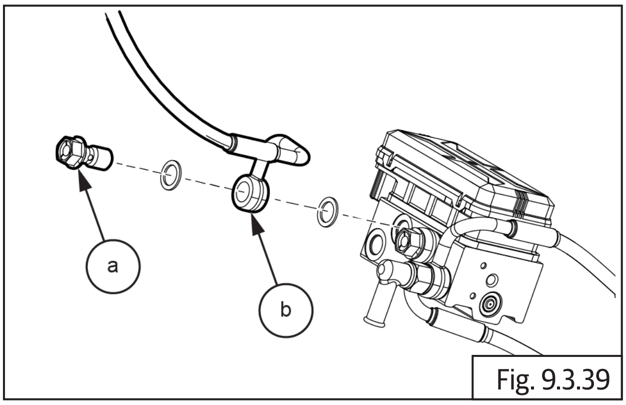


Fig. 9.3.39

🔧	12 mm Socket with Torque Wrench
Torque	23-26 N-m/2.3-2.6 kgf-m

- Locate the ABS modulator into bracket along with 4 Nos. brake hoses.

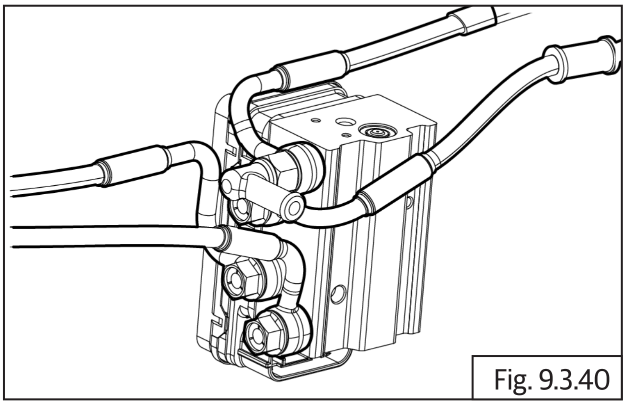


Fig. 9.3.40

- Locate and tighten hex bolt 2 Nos **(M6) (a)** at the bottom side of bracket **(b)**.

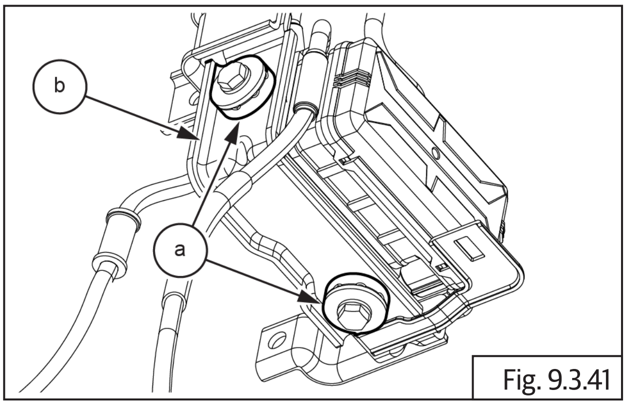


Fig. 9.3.41

🔧	10 mm Socket with Ratchet
Torque	10 N-m/1.0 kgf-m

- Gently locate and assemble modulator **(a)** along with bracket and 4 Nos. hoses into frame.

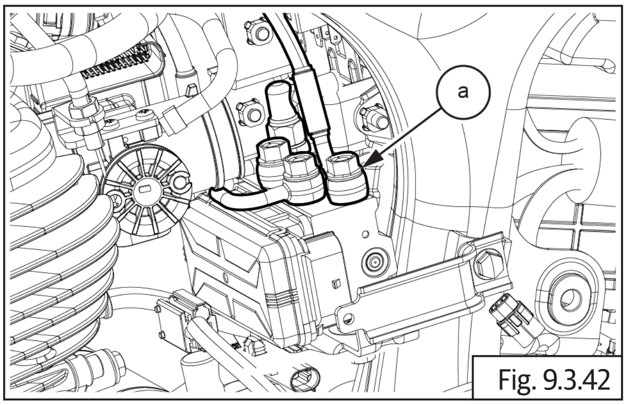


Fig. 9.3.42

- Locate and tighten 2 Nos. Hex head screws **(M6) (a)** holding ABS modulator mounting bracket to frame.

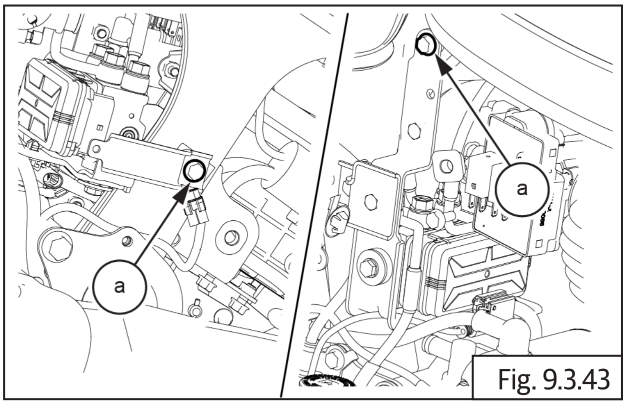


Fig. 9.3.43

🔧	10 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Connect ABS modulator electrical connector **(a)** into engine control unit (ECU).

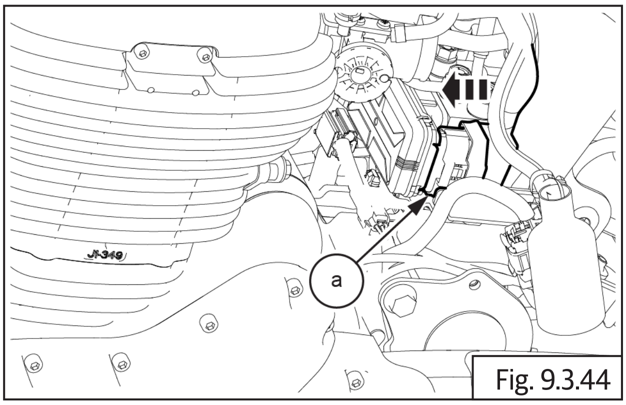


Fig. 9.3.44

- Connect holding straps **(a)** of the brake hoses to the frame/fork end/swing arm.

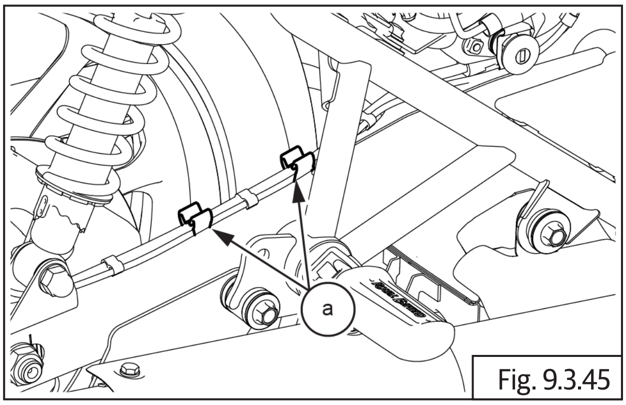


Fig. 9.3.45

- Locate brake hose mounting clamps front **(a)** into frame.

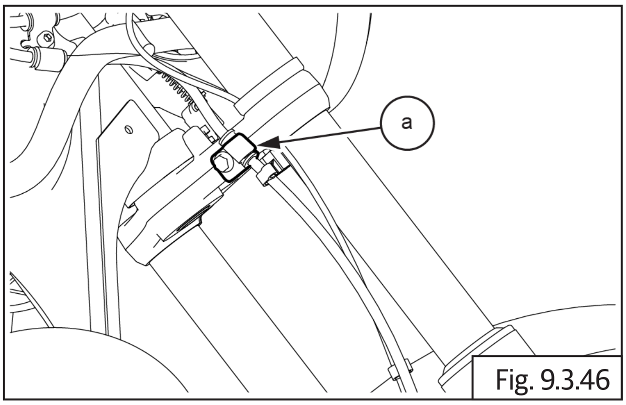


Fig. 9.3.46

- Locate and assemble banjo bolt **(a)** and connect hose **(b)** into rear master cylinder assembly.

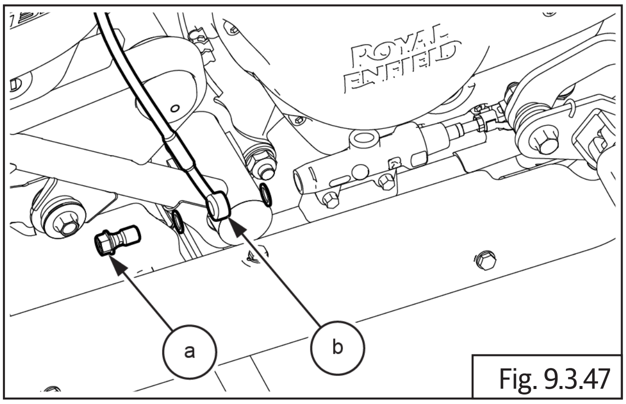


Fig. 9.3.47

🔧	12 mm Double end spanner

- Locate and assemble banjo bolt **(a)** and connect hose **(b)** into rear caliper from rear wheel RH.

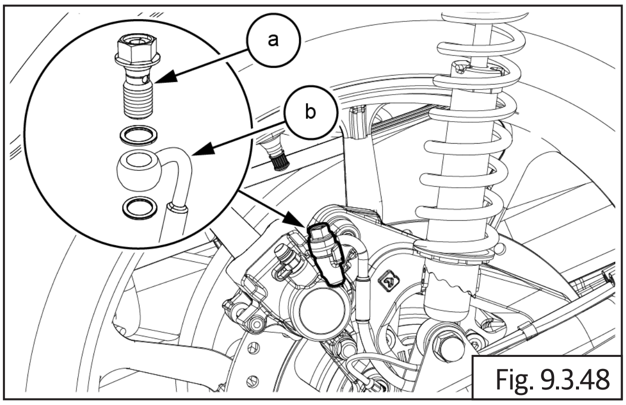


Fig. 9.3.48

🔧	12 mm Double end spanner

- Locate and assemble banjo bolt **(a)** and connect hose **(b)** into front master cylinder on handlebar RH.

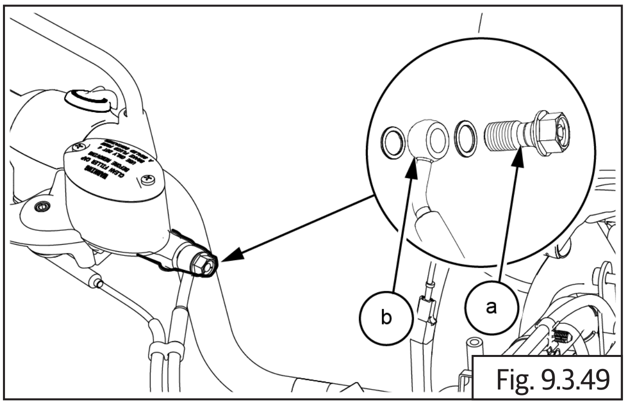


Fig. 9.3.49

🔧	12 mm Double end spanner

- Locate and assemble banjo bolt **(a)** and connect hose **(b)** into front caliper on front fork LH.

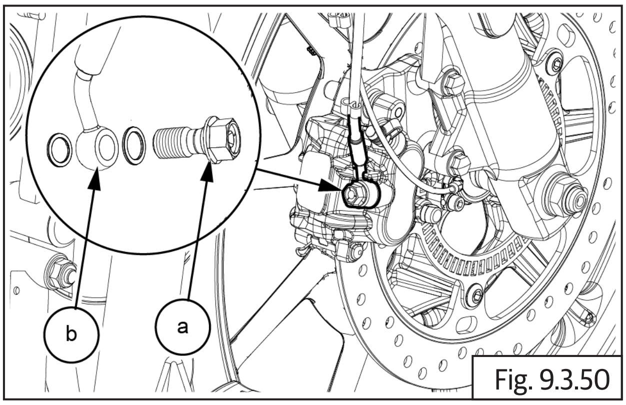


Fig. 9.3.50

🔧	12 mm Double end spanner

- **Assemble the following parts:**
  - Fuel tank assembly (section 7.1.15).
  - Rider seat (section 6.7.7).
  - Side panel RH (section 6.7.8).

⚠ CAUTION

After assembly of all aggregates, ensure the following:

- **Fuel is refilled/top up into fuel tank.**
- **Fuel feed and return hoses are properly connected into the fuel rail.**
- **Wiring couplers to fuel pump and low fuel sensors are properly connected.**
- **EVAP hose pipes are properly connected.**

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

9.3.11 ABS DTC Codes

DTC (P code)	Failure type	Failure Description	Query	Remedy
C1021	ECU	ABS ECU Internal fault	ABS Microcontroller Failure	Change ABS unit
C1019	VR	ABS ECU Relay Fault	Failure in the ABS valve relay	Change ABS unit
C1054	Valves EV	(EV) ABS Apply Solenoid Circuit Open or high Resistance (Front)	Failure in the front Inlet Valve	Change ABS unit
C1052		(EV) ABS Apply Solenoid Circuit Open or high Resistance (Rear)	Failure in the rear Inlet Valve	Change ABS unit
C1049		(AV) ABS Release Solenoid Circuit Open or high Resistance (Front)	Failure in the front Outlet Valve	Change ABS unit
C1048		(AV) ABS Release Solenoid Circuit Open or high Resistance (Rear)	Failure in the rear Outlet Valve	Change ABS unit
C1059	UZ	ABS Voltage High	Battery Voltage Too high	Check the voltage regulator/Battery
C1058		ABS Voltage Lo w	Battery Voltage Too Low	Check the Battery
C1015	RFP/RFP_HW	ABS Pump/Motor Failure	Failure in the ABS Pump Motor	Change ABS unit
C1033	WSS_ohmic	ABS Wheel Speed Circuit Open or Shorted (Front)	Failure in the Front WSS (electric)	Change Front WSS or Check wiring from WSS to ABS"
C1031		ABS Wheel Speed Circuit Open or Shorted (Rear)	Failure in the Rear WSS (electric)	Change Rear WSS or Check wiring from WSS to ABS
C1034	WSS_plausibility	ABS Wheel Speed Intermittent (Front)	Signal quality from the front WSS is not good	Check the front toner wheel/ Airgap consistency/WSS bracket
C1032		ABS Wheel Speed Intermittent (Rear)	Signal quality from the Rear WSS is not good	Check the Rear toner wheel/ Airgap consistency/WSS bracket

DTC (P code)	Failure type	Failure Description	Query	Remedy
C1024	WSS_ GENERIC	(GENERIC) ABS Wheel Speed Difference too high	Signal quality from the front/ Rear WSS is not good	Check the front toner wheel/ Airgap consistency/WSS bracket
U2922	CAN_ BUSOFF	High Speed CAN Communications Bus Fault	CAN BusOff failure	Check for CAN lines connection
U2921	CAN_ GENERIC	CAN Generic monitoring	CAN controller failure. Diagnosis is not possible with tester in this case.	Change ABS unit

Bleeding the Hydraulic Brake System With DOL Tool (Front & Rear)

9.4. Preparation (Front Disc Brake)

- Use a Philips screwdriver to loosen and remove the screws of the front disc brake master cylinder.
- Remove the cap, and Diaphragm Plate with diaphragm.
- Remove the dust cap and place the suitable ring spanner on the bleeding nipple and attach a Vinyl Pipe (transparent).
- Thereafter, take a Clean glass / Plastic container (transparent) with fresh brake fluid, and dip the other end of the vinyl pipe (transparent) in it (make sure that the vinyl pipe is always submerged in the fluid during the bleeding process).

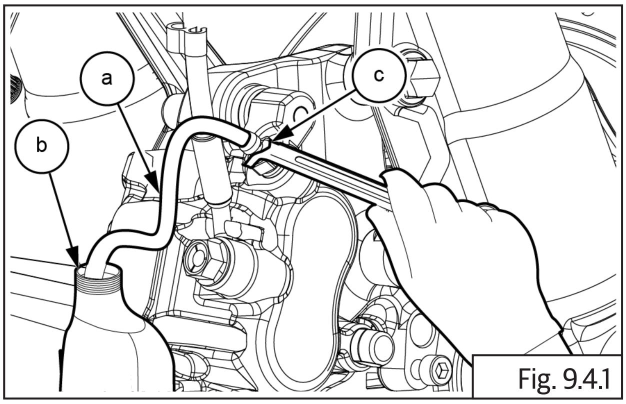


Fig. 9.4.1

- Connect the DOL tool switch "ON" the ignition.

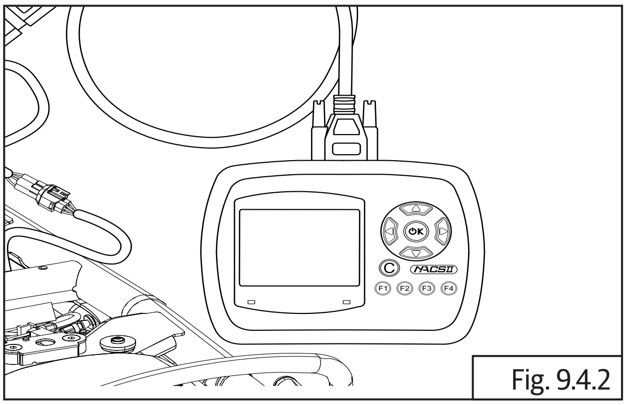
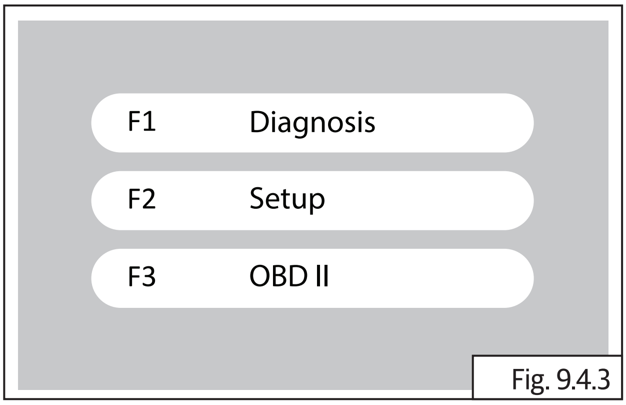


Fig. 9.4.2

Procedure

- Select – F1 Diagnosis.



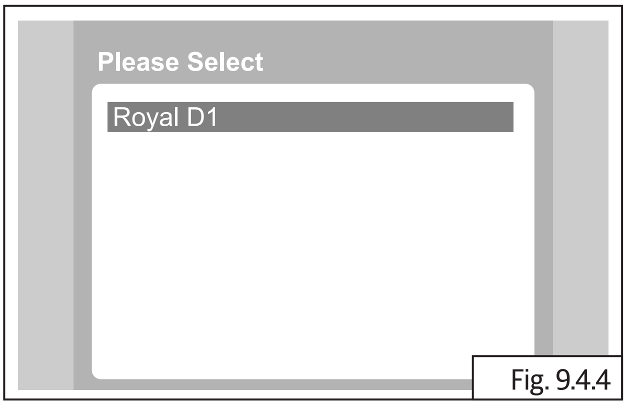
F1 Diagnosis

F2 Setup

F3 OBD II

Fig. 9.4.3

- Select – Royal D1.

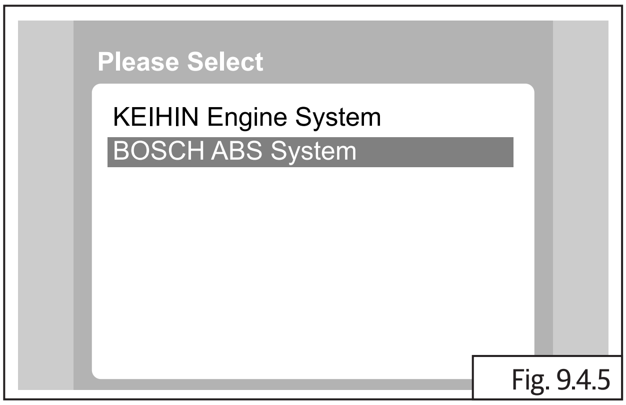


Please Select

Royal D1

Fig. 9.4.4

- Select – Bosch ABS.



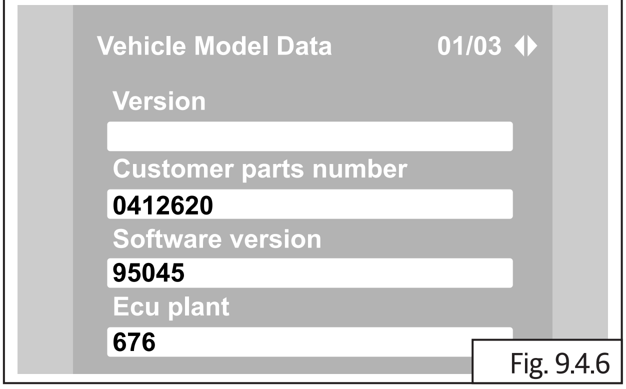
Please Select

KEIHIN Engine System

BOSCH ABS System

Fig. 9.4.5

- Default Screen.



Vehicle Model Data 01/03

Version

Customer parts number
0412620

Software version
95045

Ecu plant
676

Fig. 9.4.6

- Press C.
- Select – Spl Function.

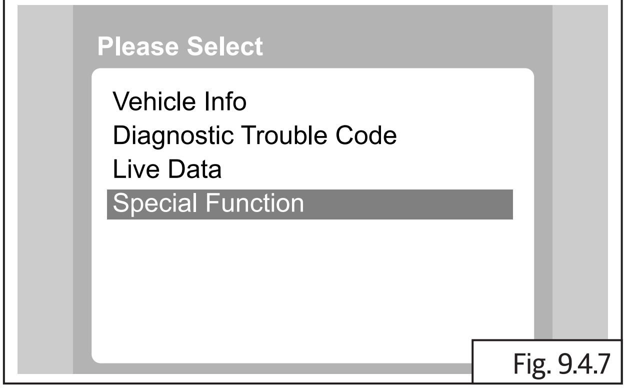

Please Select
Vehicle Info
Diagnostic Trouble Code
Live Data
Special Function

Fig. 9.4.7

- Select – Repair Air Bleed.

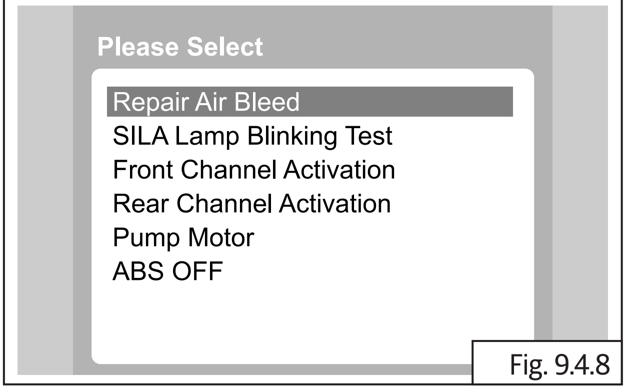
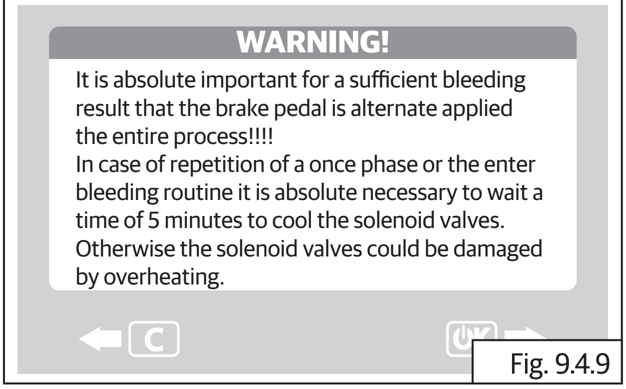

Please Select
Repair Air Bleed
SILA Lamp Blinking Test
Front Channel Activation
Rear Channel Activation
Pump Motor
ABS OFF

Fig. 9.4.8

- Default Screen.

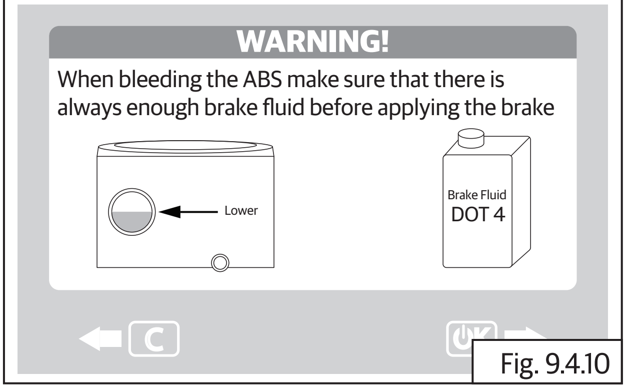


WARNING!

It is absolute important for a sufficient bleeding result that the brake pedal is alternate applied the entire process!!!!
In case of repetition of a once phase or the enter bleeding routine it is absolute necessary to wait a time of 5 minutes to cool the solenoid valves.
Otherwise the solenoid valves could be damaged by overheating.

Fig. 9.4.9

- Default Screen.



WARNING!

When bleeding the ABS make sure that there is always enough brake fluid before applying the brake

Lower
Brake Fluid
DOT 4
C

Fig. 9.4.10

- Loosen the bleeder nipple **(a)**.

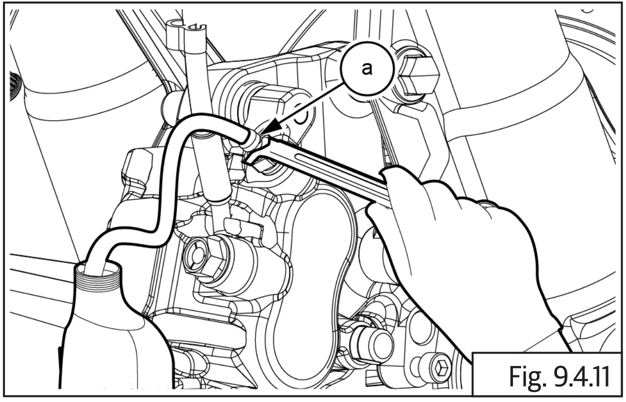


Fig. 9.4.11

- Operate the brake lever **(a)**.

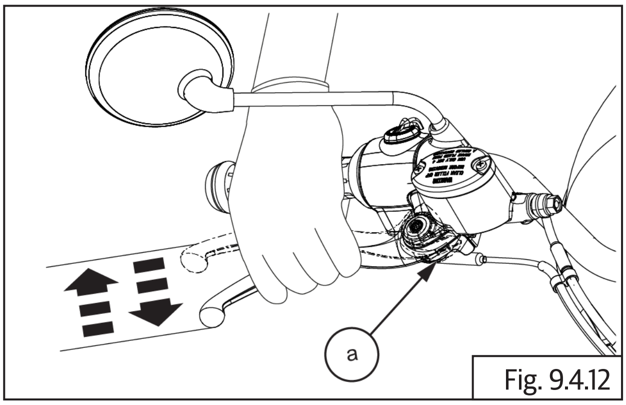


Fig. 9.4.12

- Hold the lever in pressed condition and tighten the bleeder nipple **(a)**.

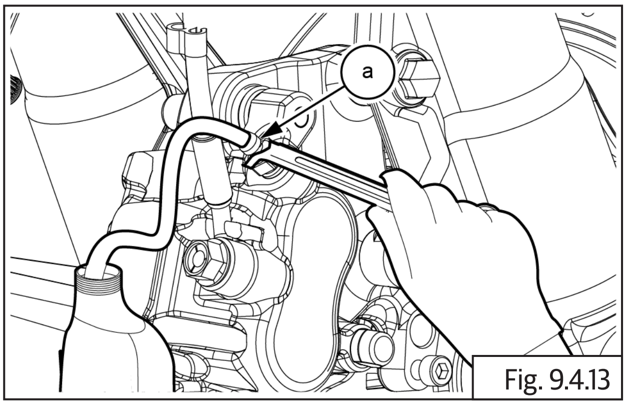


Fig. 9.4.13

- Loosen the bleeder nipple **(a)** – (Brake lever in released condition).

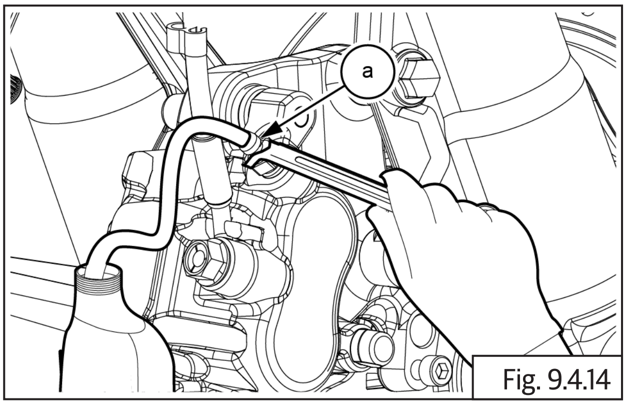


Fig. 9.4.14

- Operate the brake lever **(a)** till the next window open in DOL.

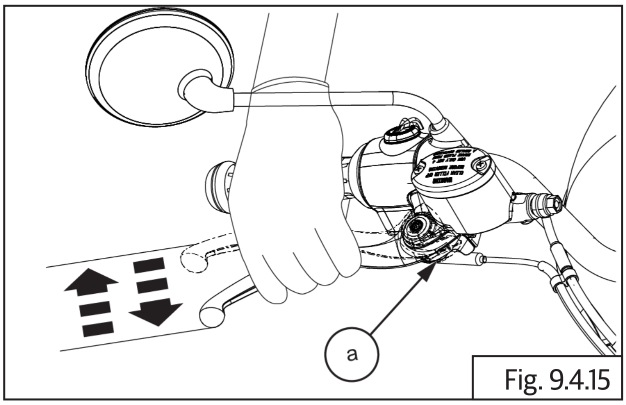


Fig. 9.4.15

- Hold the brake lever in pressed condition and tighten the bleeding nipple **(a)**.

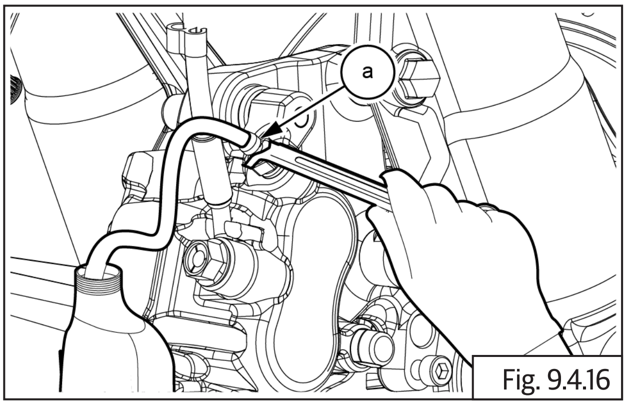


Fig. 9.4.16

- During this operation pump will run and expel the air trapped in the system through bleeder nipple.

9.5. Reassembly

- Switch OFF the ignition.
- Disconnect the DOL Tool.
- Remove the vinyl pipe and remove the ring spanner.
- Refit the dust cap (make sure that there is no leak from the bleeder nipple).
- Refit the diaphragm with diaphragm plate of the master cylinder.
- Refit the master cylinder cap taking care that the vent slot in the cap is facing rider.

9.6. Preparation (Rear Disc Brake)

- Remove the reservoir cap of the rear disc brake.
- Remove the Diaphragm Plate with diaphragm.
- Remove the dust cap and place the suitable ring spanner on the bleeding nipple.
- Attach a Vinyl Pipe (transparent).
- Thereafter, take a Clean glass / Plastic container (transparent) with fresh brake fluid, and dip the other end of the vinyl pipe (transparent) in it (make sure that the vinyl pipe is always submerged in the fluid during the bleeding process).

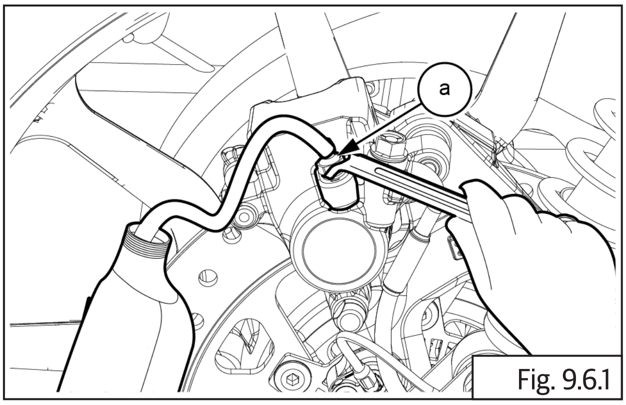


Fig. 9.6.1

- Connect the DOL tool switch on the ignition

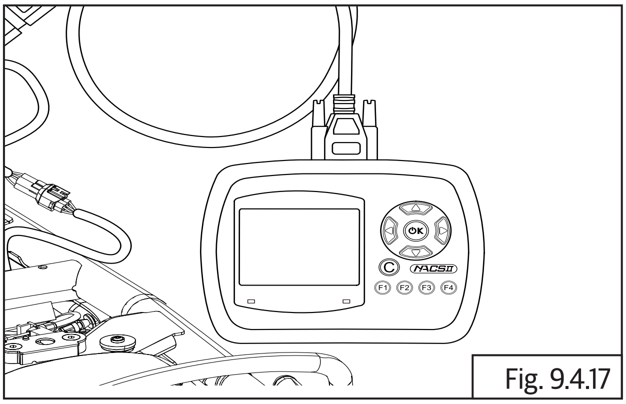


Fig. 9.4.17

- Loosen the bleeder nipple.

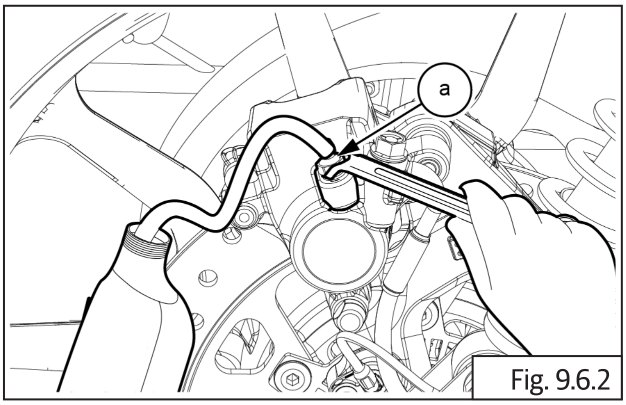
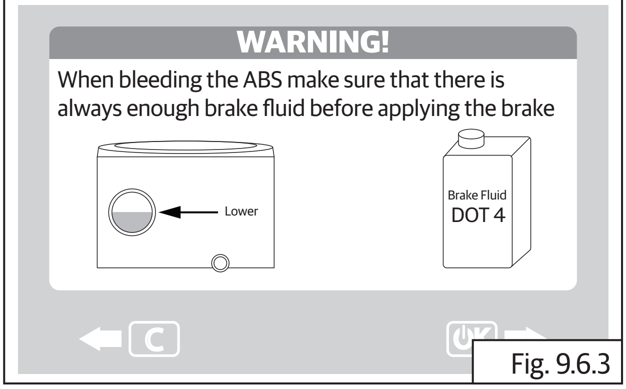


Fig. 9.6.2

- Default Screen.



WARNING!

When bleeding the ABS make sure that there is always enough brake fluid before applying the brake

Fig. 9.6.3

- Operate the brake lever.

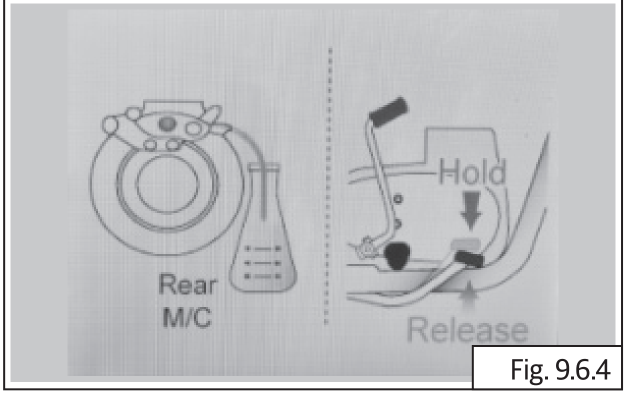


Fig. 9.6.4

- Hold the brake Pedal **(a)** in pressed condition and tighten the bleeding nipple.

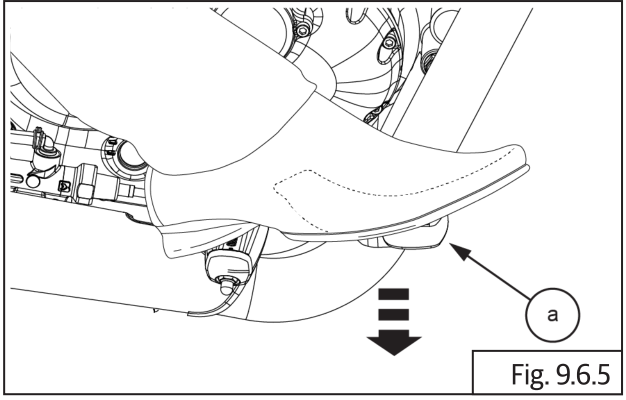


Fig. 9.6.5

- Loosen the bleeder nipple – (Brake lever in released condition)

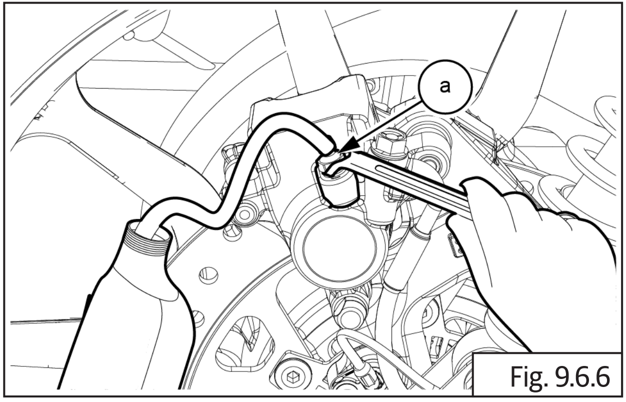


Fig. 9.6.6

- Operate the brake lever until the next window opens in DOL.

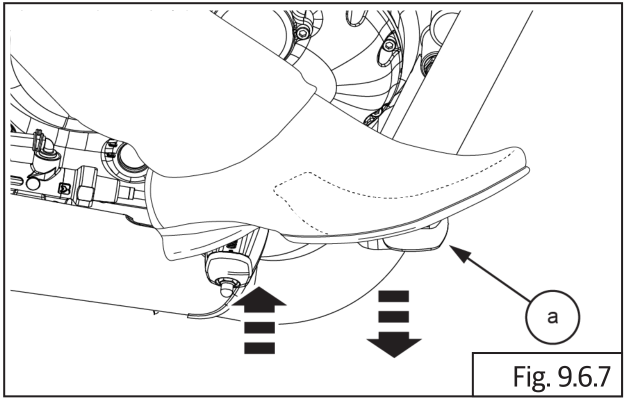


Fig. 9.6.7

- Hold the brake lever in pressed condition and tighten the bleeding nipple.

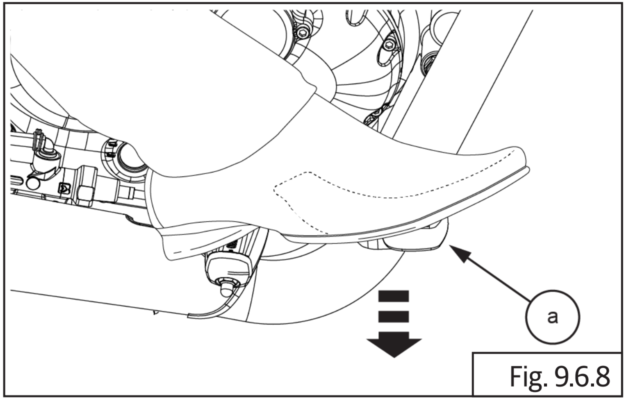


Fig. 9.6.8

- During this operation pump will run and expel the air trapped in the system through bleeder nipple

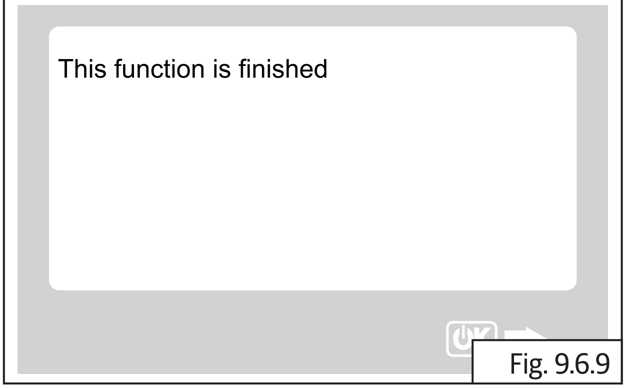

This function is finished

Fig. 9.6.9

9.7. Reassembly

- Switch OFF the ignition and disconnect and remove the DOL tool.
- Remove the vinyl pipe and remove the ring spanner.
- Refit the dust cap (make sure that there is no leak from the bleeder nipple).
- Refit the diaphragm with diaphragm plate of the reservoir.
- Refit the reservoir cap.

BRAKE BLEEDING (Front & Rear)
Manual Method

9.8. Brake Bleeding

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

Support motorcycle with suitable equipment below cradle frame.

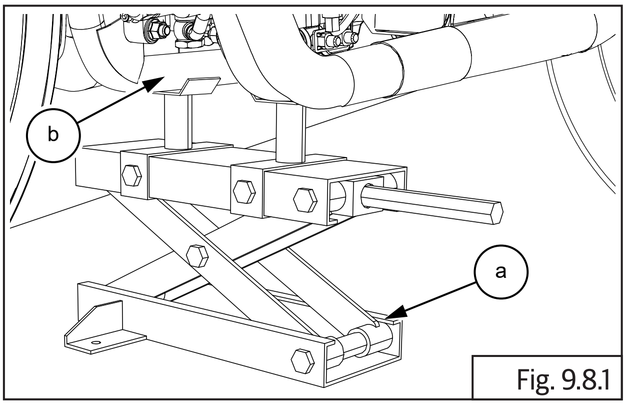


Fig. 9.8.1

⚠ CAUTION

Do not spill brake fluid on any part of the motorcycle as it will damage the painted/ plastic surfaces.

⚠ WARNING

Ensure brake fluid does not get in contact with eyes and skin. In-case of exposure wash affected area thoroughly with water. Seek medical attention immediately if any irritation persists.

Keep out of reach of children.

Dispose drained brake fluid carefully and responsibly.

⚠ WARNING

Brake fluid is Hygroscopic hence, absorbs moisture from air. Ensure fluid reservoirs caps are closed properly.

If moisture in the brake system may cause damage to brake parts and fluid, causing reduction in braking efficiency; which in turn may lead to fatal accidents.

NOTE

- *Use brake fluid from sealed containers only.*
- *Use only DOT4 specification brake fluid listed in technical specifications (section 2.4).*
- *Ensure ignition switch and stop switch are in ON position.*

9.8.1. Front Brake Bleeding

- Loosen and remove 2 Nos. screws **(a)** from front brake reservoir tank.

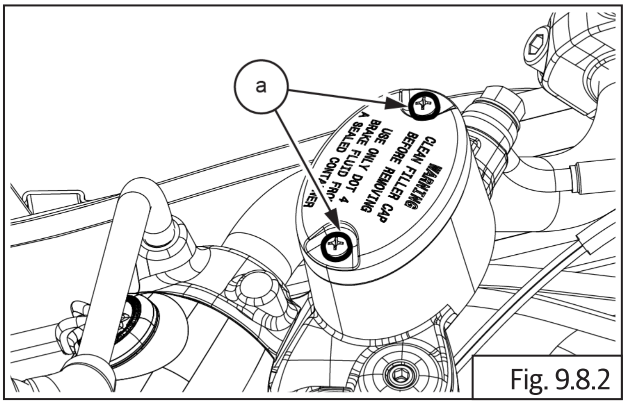

a
WARNING
CLEAN FILLER CAP
BEFORE REMOVING
USE ONLY
BRAKE FLUID DOT 4
A SEALED CONTAINER

Fig. 9.8.2

🔧	Screw driver phillips

- Remove reservoir cap **(a)** from front brake reservoir tank **(b)**.

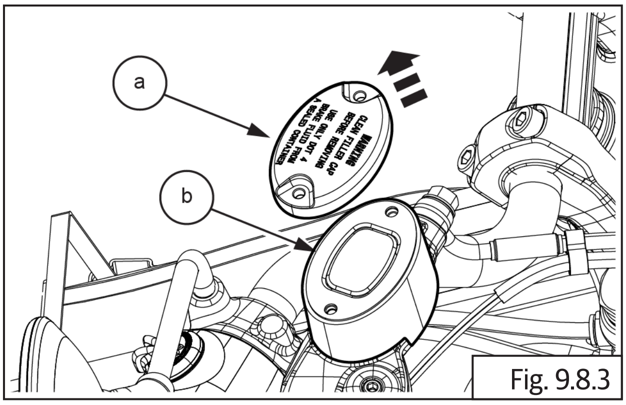

a
b
WARNING
CLEAN FILLER CAP
BEFORE REMOVING
USE ONLY
BRAKE FLUID DOT 4
FROM A SEALED CONTAINER

Fig. 9.8.3

- Remove reservoir diaphragm **(a)** from front brake reservoir tank **(b)**.

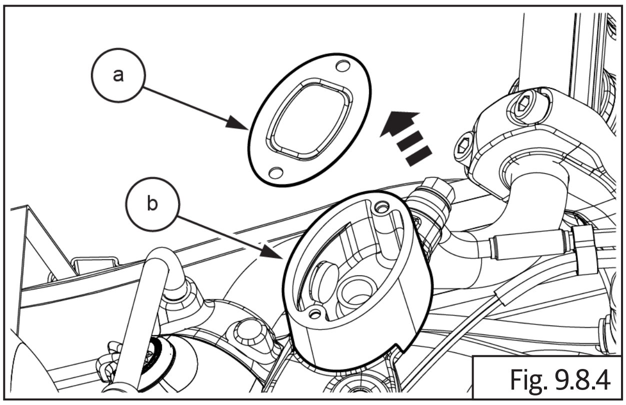


Fig. 9.8.4

- Gently top up fresh brake fluid **(a)** into reservoir **(b)**.
- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.

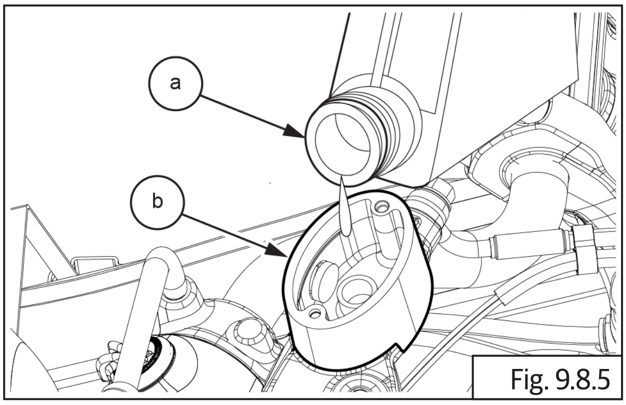


Fig. 9.8.5

- Locate diaphragm and cap **(a)** on the reservoir and DO NOT fasten with screws.

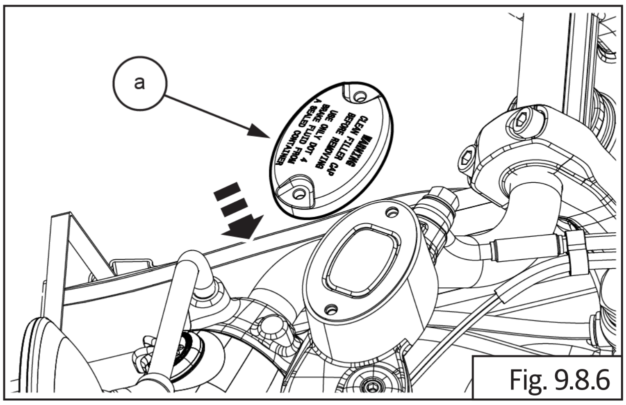

a
WARNING
CLEAN FILLER CAP
BEFORE REMOVING
USE ONLY DOT 4
BRAKE FLUID FROM
A SEALED CONTAINER

Fig. 9.8.6

- Remove rubber cap **(a)** from bleeder valve from front caliper on front wheel RH.

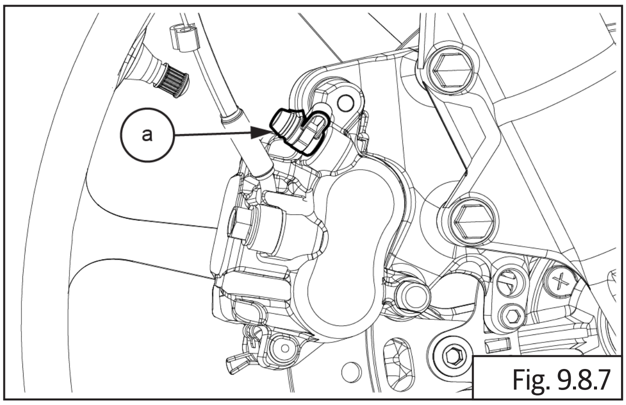


Fig. 9.8.7

- Dip bleeder hose **(a)** one end into a container **(b)** with fresh brake fluid to avoid air passage into bleeder valve.
- Insert bleeder hose other end into bleeder valve **(c)** on front caliper to drain used oil.

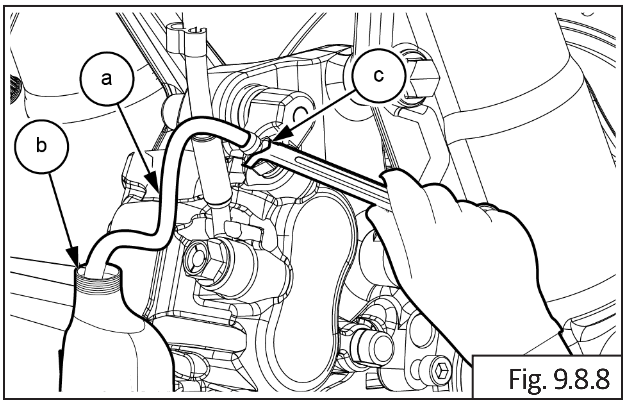


Fig. 9.8.8

NOTE

- *Use brake fluid from new, sealed containers only.*
- *Use only DOT4 specification brake fluid listed in technical specifications (section 2.4).*

- Gently pump brake lever **(a)** until brake is effective.
- Once brake lever is effective, hold it in place.

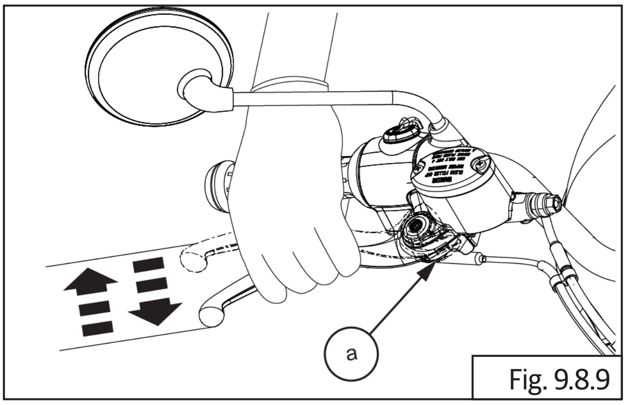


Fig. 9.8.9

- While holding brake lever, quickly open and close bleeder valve **(M6) (a)**.

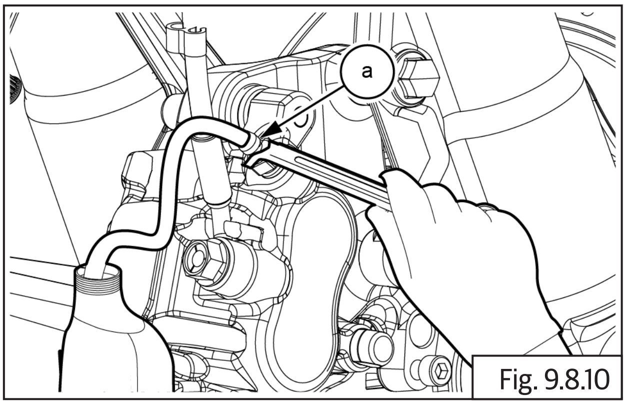


Fig. 9.8.10

🔧	11 mm Ring spanner and air bleeder.

- Release the brake lever.

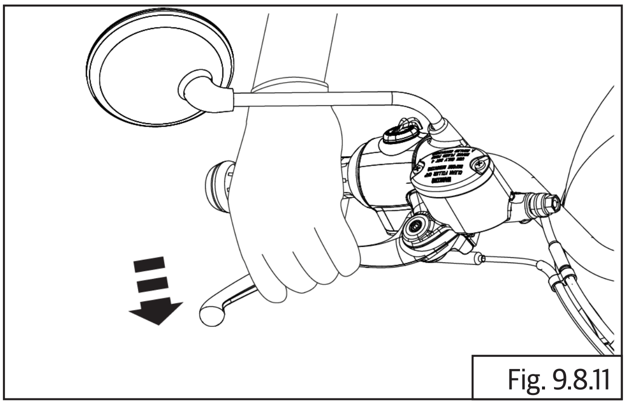


Fig. 9.8.11

- Gently top up fresh brake fluid **(a)** into reservoir **(b)**.
- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.

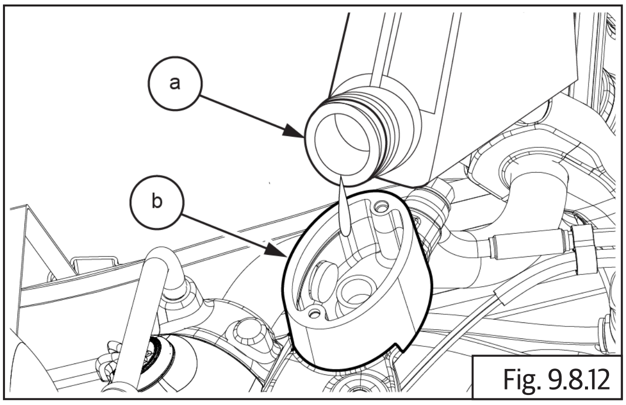


Fig. 9.8.12

- Repeat this operation until air from the system is released completely. Observe bleeder hose. As air in the system is cleared, bubbles stop appearing in hose.

⚠ CAUTION

While bleeding the brake system always ensure brake fluid is above min level BUT below "Max" level. Never allow the brake fluid go below minimum level to avoid air entering brake system. Always fill the brake fluid from sealed container only.

Do not leave the master cylinder cap and or brake fluid container open for long as brake fluid is highly hygroscopic in nature a and will loose its properties if exposed to atmospheric conditions.

- Inspect brake lever efficiency.

NOTE

- *The fluid level must be checked often during the bleeding operation and top up with fresh brake fluid as necessary.*
- *Gently tap brake hose for proper bleeding performance.*
- *Check brake fluid level after completion of brake bleeding.*
- *Whenever the modulator is removed or replaced the brake bleeding time will be longer as brake fluid will have to travel from master cylinder to modulator and then to wheel caliper*
- *Whenever bleeding the brake system, it is always recommended to bleed both the front and rear brakes.*

- Remove bleeder hose **(a)** from bleeder valve **(b)**.

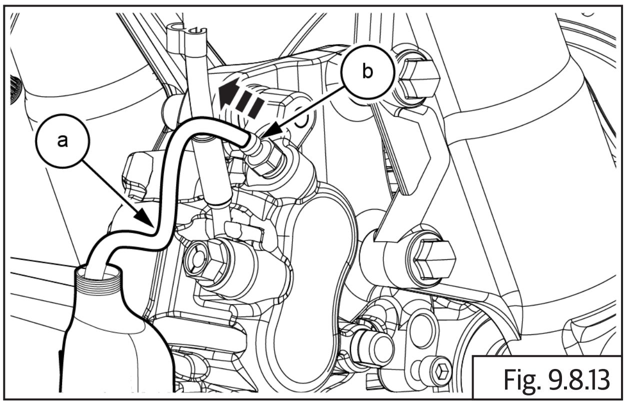


Fig. 9.8.13

- Close rubber cap **(a)** on bleeder valve **.**
- Ensure cap is locked properly to avoid exposure to dust or mud.

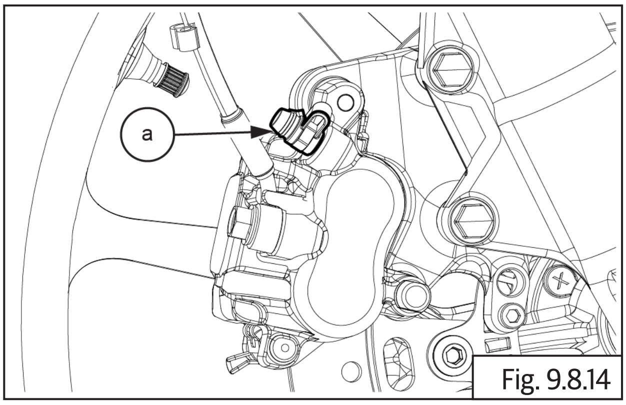


Fig. 9.8.14

- Install reservoir diaphragm **(a)** into front brake reservoir tank **(b)**.

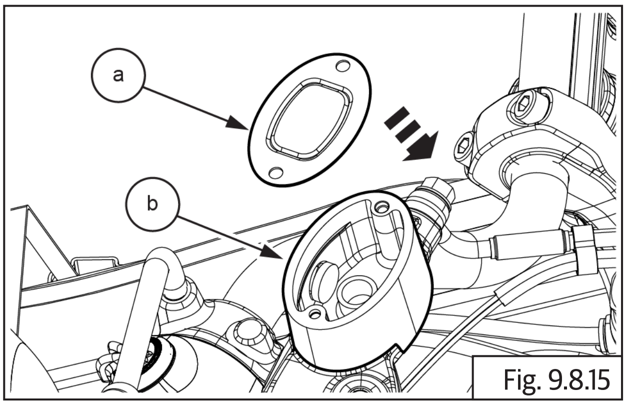


Fig. 9.8.15

- Locate and tighten 2 Nos. screws **(a)** into front brake reservoir tank **(b)**.

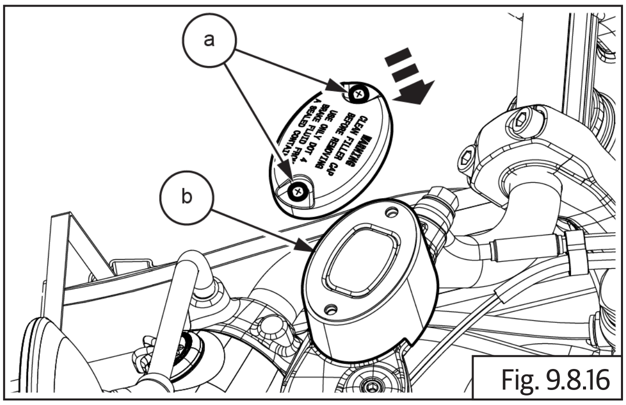


Fig. 9.8.16

🔧	Screw driver

9.8.2. Front Brake Fluid Leakage

⚠ CAUTION

Ensure motorcycle is placed on a flat surface resting it on ramp/center stand.

NOTE

- *Inspect fluid level at every 5000 Km (3000 miles). Replace fluid after 25000 Km (15000 miles).*

- Inspect fluid level, visible in window glass on front reservoir tank **(a)**.
- Ensure brake fluid level is always above 'MIN' mark **(b)** on window.

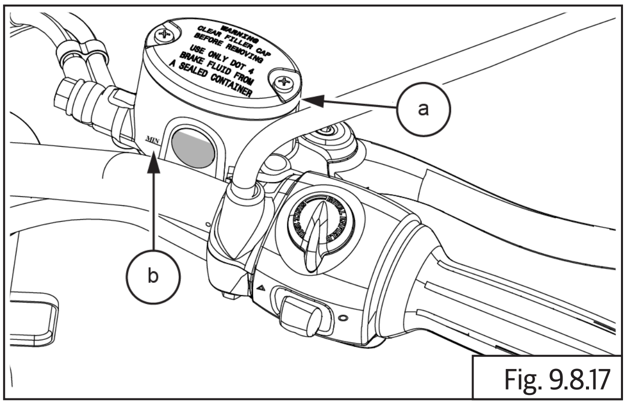

WARNING
CLEAN FILLER CAP
BEFORE REMOVING
USE ONLY DOT 4
BRAKE FLUID FROM
A SEALED CONTAINER
MIN
a
b

Fig. 9.8.17

- If oil level is below ‘MIN’, inspect leakage at front brake hoses and front master cylinder banjo bolt.

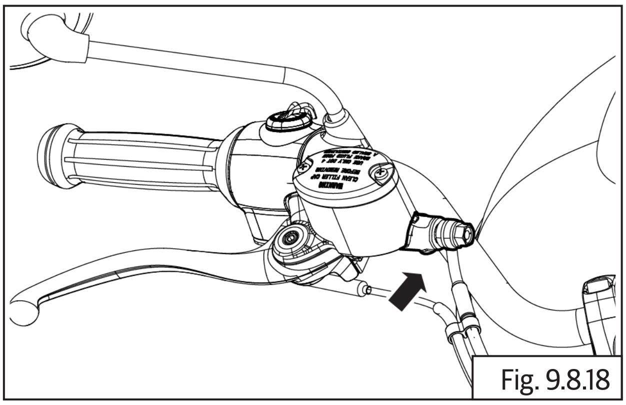


Fig. 9.8.18

- Inspect leakage at caliper banjo bolt.

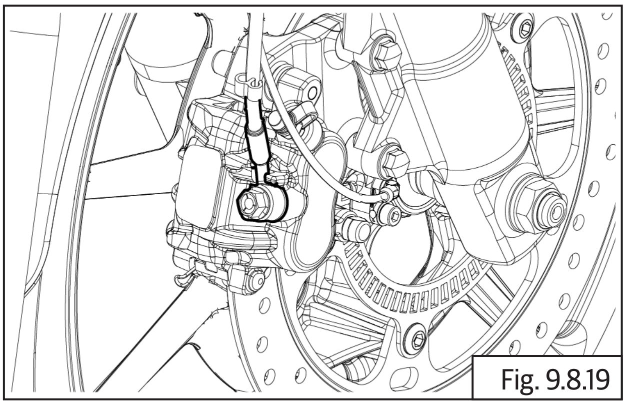


Fig. 9.8.19

- Inspect leakage on brake disc from caliper piston.

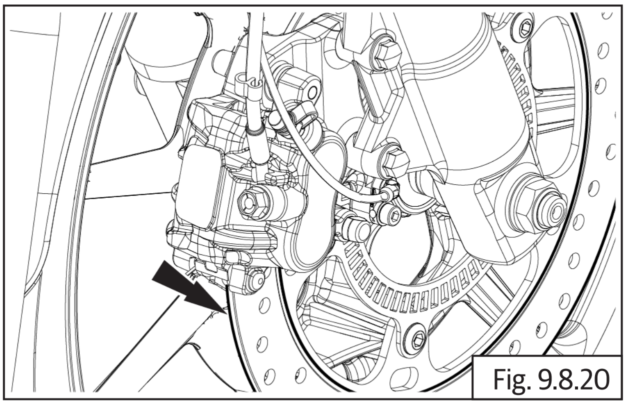


Fig. 9.8.20

- Inspect fluid leakage at hoses at ABS modulator.

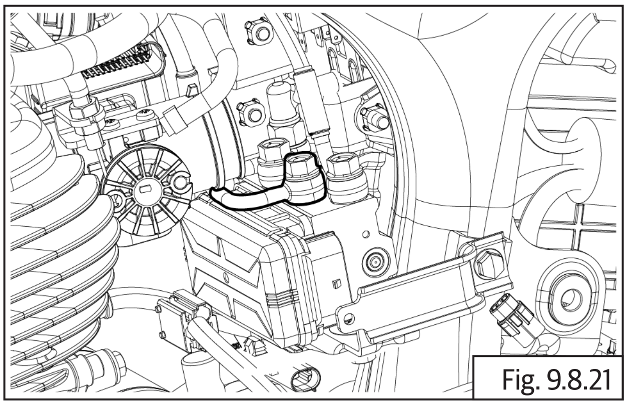
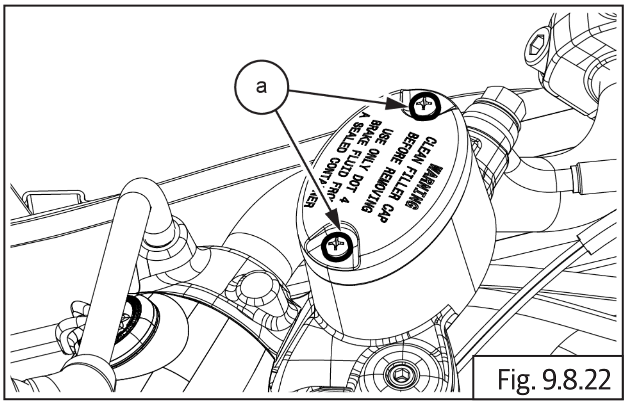


Fig. 9.8.21

9.8.3. Front Brake Fluid Top up

- Loosen and remove 2 Nos. screws **(a)** from front brake reservoir tank.



a
WARNING
CLEAN FILLER CAP
BEFORE REMOVING
USE ONLY DOT 4
BRAKE FLUID FRO
SEALED CONTA ER

Fig. 9.8.22

🔧	Screw driver

- Remove reservoir cap **(a)** from front brake reservoir tank **(b)**.

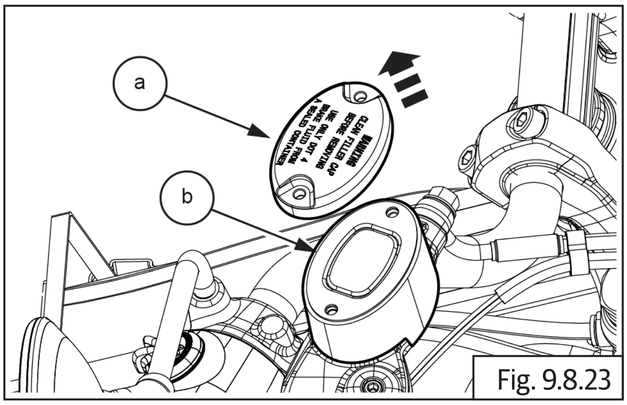


Fig. 9.8.23

- Remove reservoir diaphragm **(a)** from front brake reservoir tank **(b)**.

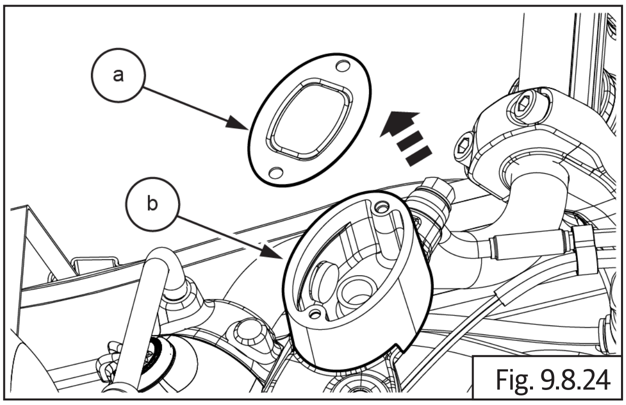


Fig. 9.8.24

- Top up fresh fluid **(a)** into reservoir tank **(b)** up to 'MAX' mark on the window.
- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.

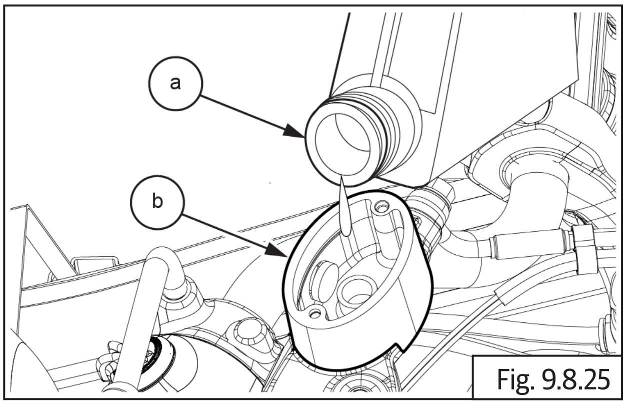


Fig. 9.8.25

9.8.4. Rear Brake Bleeding

CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

Support motorcycle with suitable equipment below cradle frame.

- Rear brake reservoir is located near rear wheel on cradle frame.
- Open rear brake reservoir cap **(a)** from reservoir **(b)**.

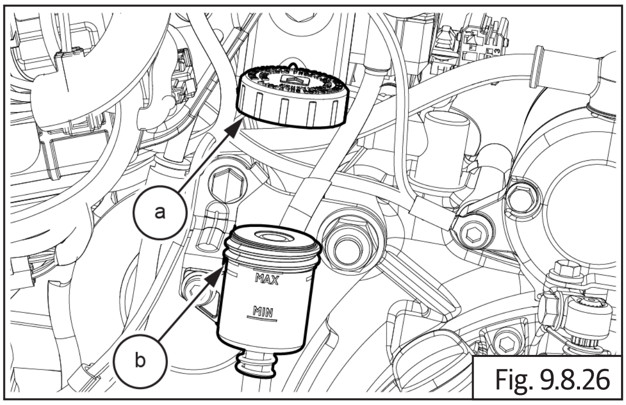


Fig. 9.8.26

NOTE

- *Use brake fluid from sealed containers only.*
- *Use only DOT4 specification brake fluid listed in technical specification Information (section 2.4).*

- Fill fresh brake fluid **(a)** into reservoir **(b)**.

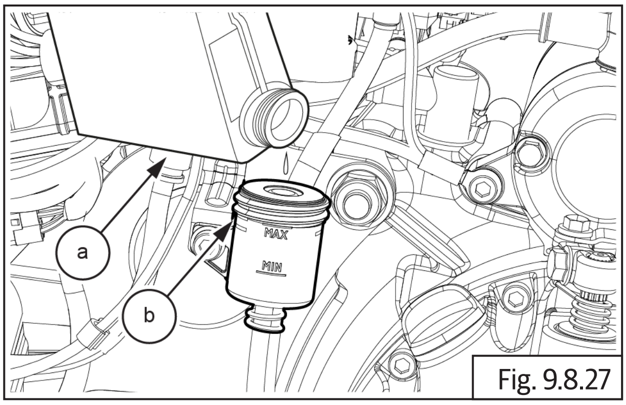


Fig. 9.8.27

- Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.
- Locate the reservoir cap **(a)** on the tank and ensure it is seated properly.

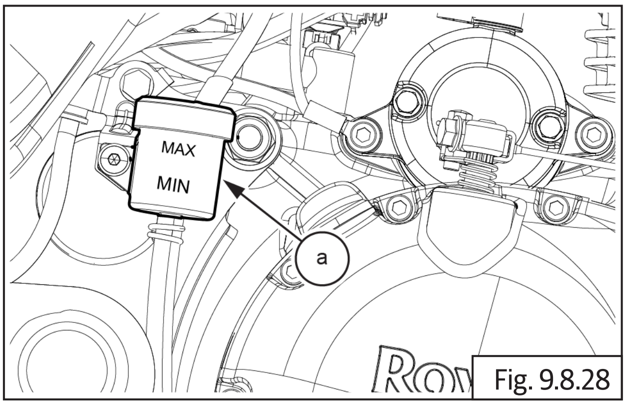


Fig. 9.8.28

- Locate rear brake bleeder valve on rear wheel brake caliper, behind silencer.
- Open rubber cap **(a)** from rear brake bleeder valve **(b)**.

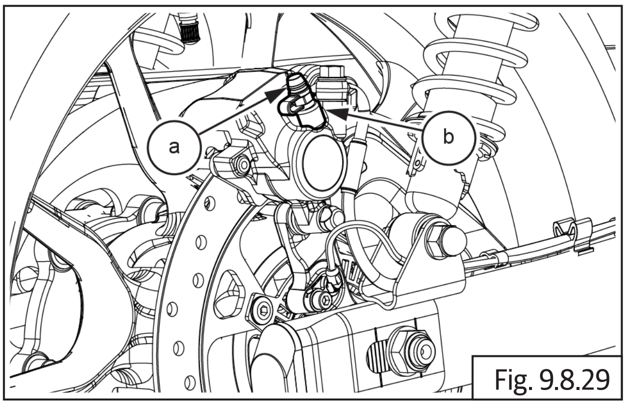


Fig. 9.8.29

- Dip bleeder hose **(a)** one end into a container **(b)** with fresh brake fluid to avoid air passage into bleeder valve.
- Insert bleeder hose other end into bleeder valve **(M6) (c)** on front caliper to drain used oil.

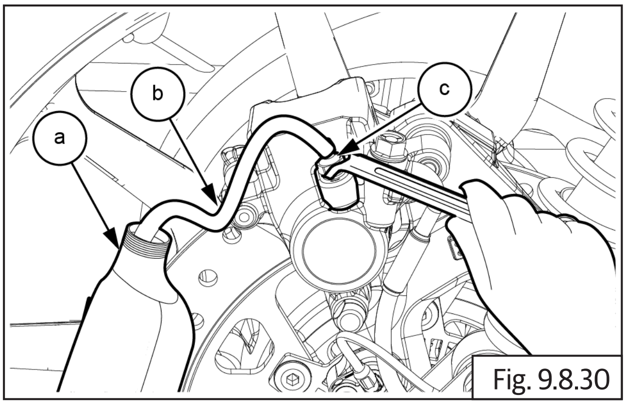


Fig. 9.8.30

	11 mm Ring spanner

- Gently pump rear brake pedal **(a)** until pumping becomes hard and then hold it in place.

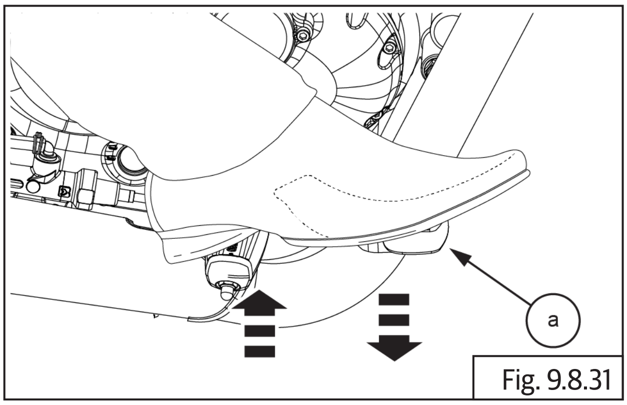


Fig. 9.8.31

- While holding brake, quickly open and close bleeder valve **(M6) (a)**.

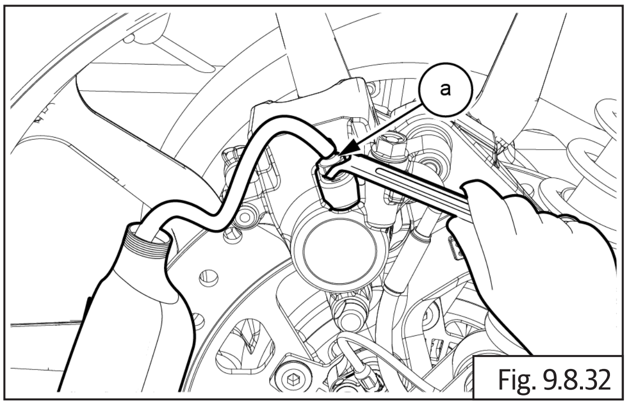


Fig. 9.8.32

- Repeat this operation until air from system is released completely.
- Inspect brake lever efficiency.

NOTE

- *The fluid level must be checked often during the bleeding operation and top up with fresh brake fluid as necessary.*
- *Gently tap brake hose for proper bleeding performance.*
- *Check brake fluid level after completion of brake bleeding.*

- Remove bleeder hose **(a)** from bleeder valve on rear caliper.

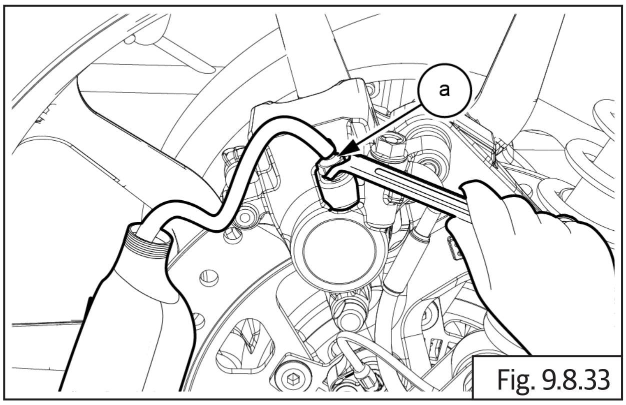


Fig. 9.8.33

- Close bleeder valve **(a)** rubber cap **(b)**.
- Ensure cap is locked properly to avoid exposure to dust or mud.

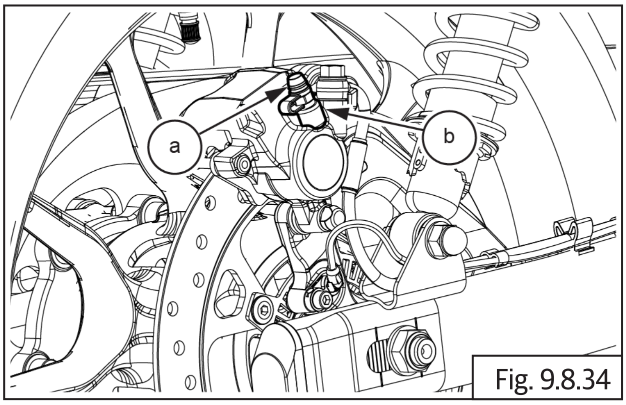


Fig. 9.8.34

9.8.5. Rear Brake Fluid Leakage

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

NOTE

- *Inspect fluid level at every 5000Km (3000 miles). Replace fluid after 25000Km (15000 miles).*

- Inspect fluid level visible on rear reservoir tank.
- Ensure brake fluid level in rear reservoir tank is always between 'MIN' and 'Max' marks.

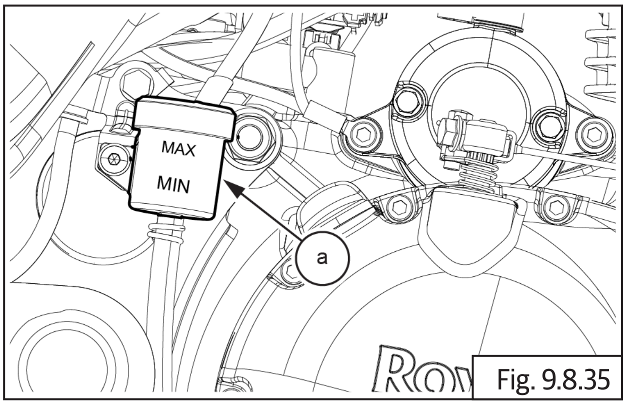


Fig. 9.8.35

- If oil level is below 'MIN', inspect leakage at rear brake hoses and rear master cylinder banjo bolt.

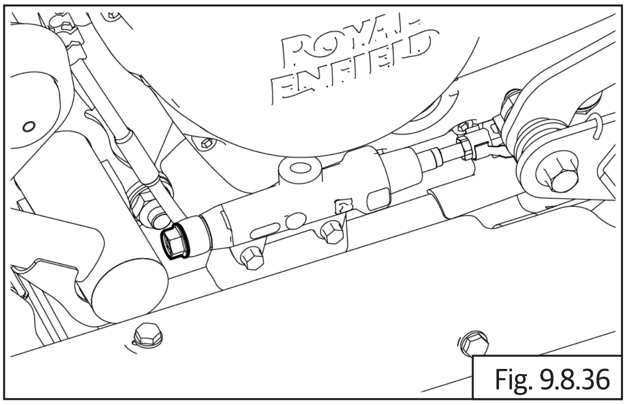


Fig. 9.8.36

- Inspect leakage at rear caliper banjo bolt.

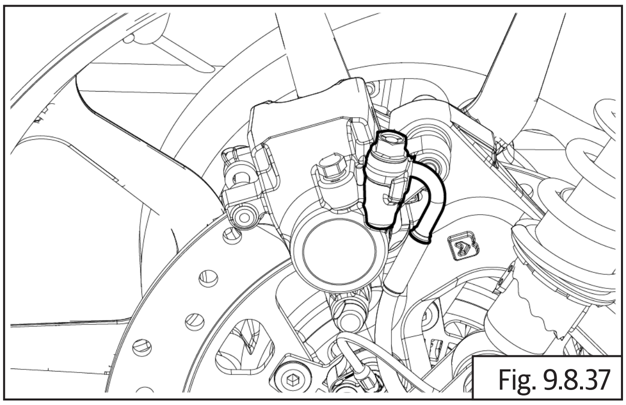


Fig. 9.8.37

- Inspect leakage on brake disc from caliper piston.

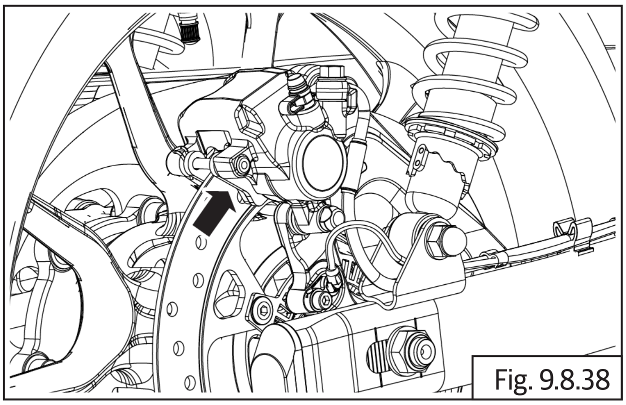


Fig. 9.8.38

- Inspect fluid leakage at hoses on ABS modulator.

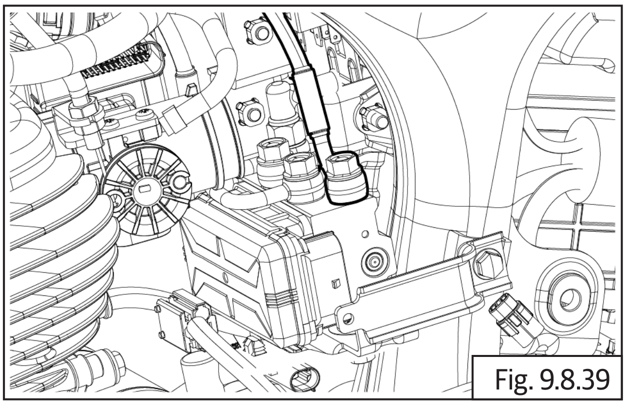


Fig. 9.8.39

9.8.6. Rear Brake Fluid Top Up

- Open rear brake reservoir cap **(a)** from reservoir **(b)**.

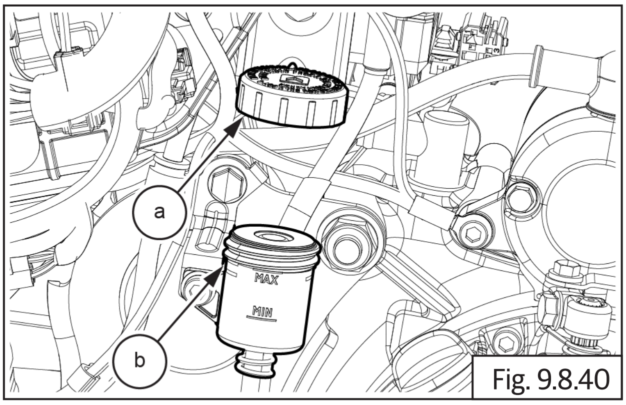


Fig. 9.8.40

- Top up fresh brake fluid **(a)** into reservoir tank **(b)** only up to MAX level. Do not over fill as it may cause malfunctioning of some parts due to brake fluid spillage.

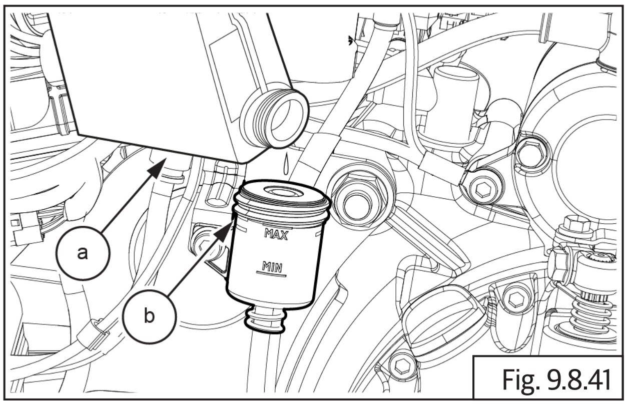


Fig. 9.8.41

- Locate the reservoir cap **(a)** on the tank and ensure it is seated properly.

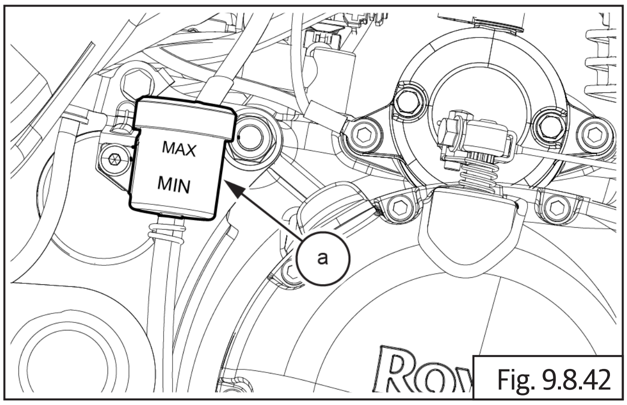


Fig. 9.8.42

ENGINE MANAGEMENT SYSTEM (EMS)

Engine Management System

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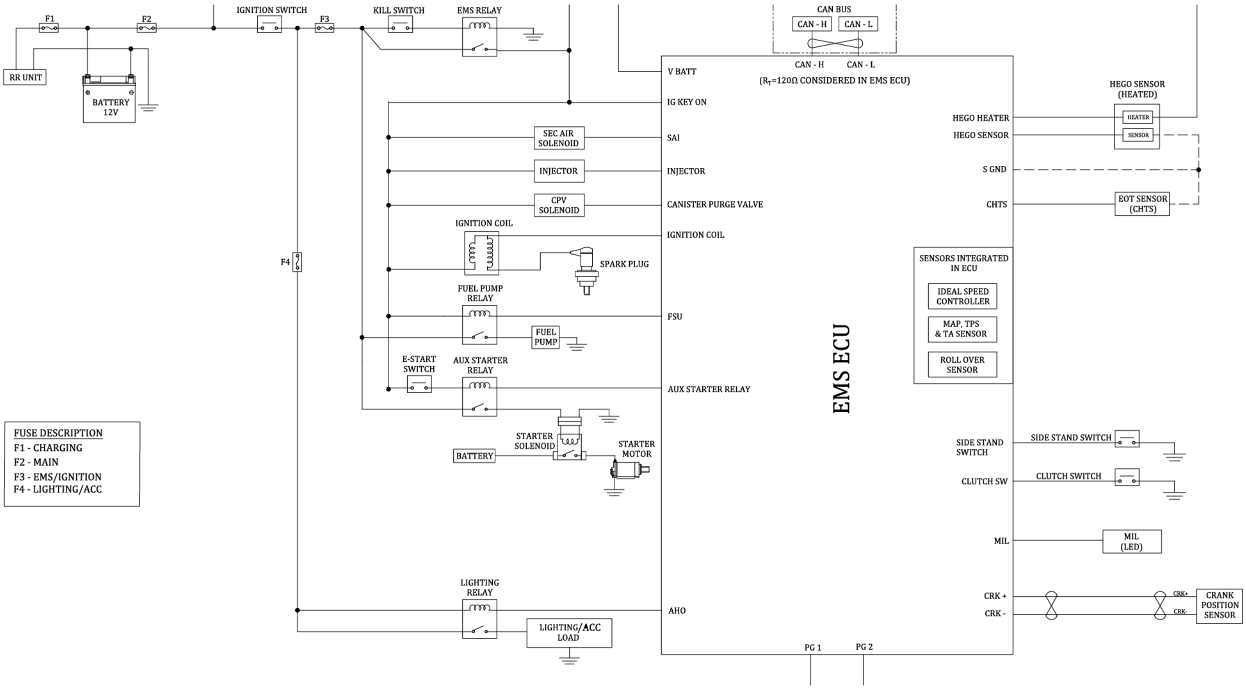
10. Engine Management System (EMS)

Engine Management System is responsible for controlling the amount of fuel being injected and for adjusting the ignition timing. Optimum functioning of EMS assures maximum engine power with the lowest amount of exhaust emissions and lowest fuel consumption.

EMS Components

- Electronic Control Unit (Integrated with Throttle Body)
- Fuel Injector
- Fuel Supply Module
- Throttle Position Senor (In-built within ECU)
- Manifold Pressure Sensor (In-built within ECU)
- Canister Purge Valve
- HEGO (O2) Sensor
- Idle Air Control Valve (In-built within ECU)
- Secondary Air Injection Solenoid
- Engine Oil Temperature Sensor
- Intake Air Temperature Sensor (In-built within ECU)
- Clutch Switch
- Side Stand Switch
- Gear Position Sensor
- Roll Over Sensor (In-built within ECU)
- Crank Position Sensor
- Starter Motor Relay

Functional Diagram


F1
F2
RR UNIT
BATTERY 12V
IGNITION SWITCH
F3
KILL SWITCH
EMS RELAY
F4
SEC AIR SOLENOID
INJECTOR
CPV SOLENOID
IGNITION COIL
SPARK PLUG
FUEL PUMP RELAY
FUEL PUMP
E-START SWITCH
AUX STARTER RELAY
STARTER SOLENOID
BATTERY
STARTER MOTOR
FUSE DESCRIPTION
F1 - CHARGING
F2 - MAIN
F3 - EMS/IGNITION
F4 - LIGHTING/ACC
LIGHTING RELAY
LIGHTING/ACC LOAD
CAN BUS
CAN - H
CAN - L
CAN - H
CAN - L
(R_T=120Ω CONSIDERED IN EMS ECU)
V BATT
IG KEY ON
SAI
INJECTOR
CANISTER PURGE VALVE
IGNITION COIL
FSU
AUX STARTER RELAY
AHO
EMS ECU
PG 1
PG 2
HEGO SENSOR (HEATED)
HEATER
SENSOR
HEGO HEATER
HEGO SENSOR
S GND
CHTS
EOT SENSOR (CHTS)
SENSORS INTEGRATED IN ECU
IDEAL SPEED CONTROLLER
MAP, TPS & TA SENSOR
ROLL OVER SENSOR
SIDE STAND SWITCH
SIDE STAND SWITCH
CLUTCH SW
CLUTCH SWITCH
MIL
MIL (LED)
CRK +
CRK -
CRK+
CRK-
CRANK POSITION SENSOR

Functional Specifications

1. Electronic Control Unit (ECU) Integrated with Throttle Body

Electronic Control Unit integrated with throttle body and makes a single module. Electronic control unit is any embedded system that controls one or more electrical system or subsystems in a vehicle. Engine Control Unit is a type of Electronic

Control Unit that controls a series of actuators on an internal combustion engine to ensure optimal engine performance. It does this by reading values from a multitude of sensors within the engine bay, interpreting the data using multidimensional performance maps (called lookup tables), and adjusting the

engine actuators accordingly.

Here ECU consists of a printed circuit board (PCB) assembly contained the plastic housing. The PCB assembly is electrically connected to the following hardware within the throttle body: air intake temperature sensor, air pressure sensor, throttle position sensor and idle flow actuator. .

Key Elements:

1.Micro Controller

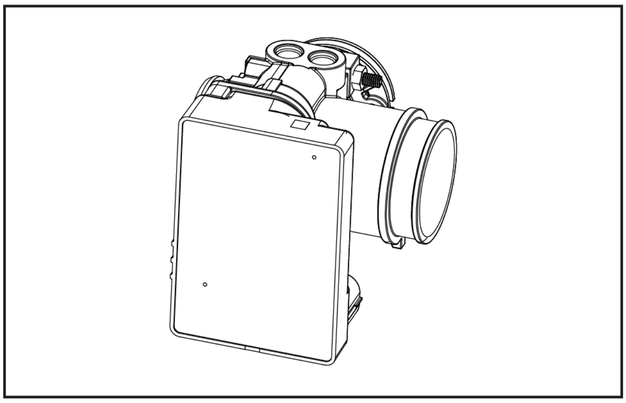
2.Memory

3.Inputs

4.Outputs

5.Communication Links

6. Throttle Body and In-built Sensors



Specification:

Operating Voltage: 8 to 16 V

Operating temperature: –20ºC to 85ºC

2. Fuel Injector

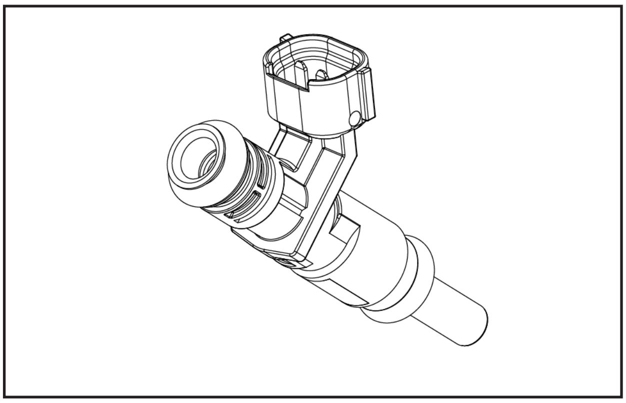
Fuel injector use pintle valves are operated by electromagnetic components called solenoids. The solenoid is activated, or "pulses" by an ECU which causes it to undergo linear movement.
Since the solenoid is mechanically connected to a pintle valve within the fuel injector, the linear movement causes the pintle to move away from its seat. A small amount of highly pressurized fuel then sprays from the pintle nozzle.

Specification:

Resistance: 12Ω ± 0.6Ω at 21 ± 2°C

Operating Voltage : 6 to 16 V

Operating Pressure: 200-600 kPa



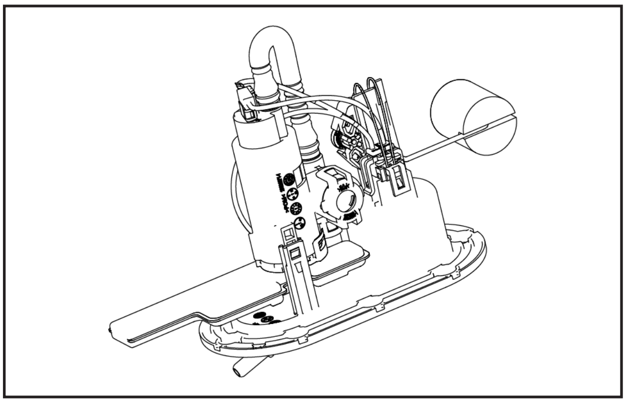
3. Fuel Supply Module

The Fuel pump is located on the left bottom of the tank and submerged in the fuel so that it cannot ignite itself due to any electrical short circuits. The fuel pump has an micro filter which helps to filter even the minute dust particles that may come in the fuel. The pressure regulator maintains the pressure of 350 kpa pushing the gasoline to the injector.

Specification:

Operating Voltage: 8 to 16 V

Operating Fuel Pressure: 350 ± 14 kPa



4. Throttle Position Sensor

A Throttle Position Sensor (Tps) is used to monitor the position of the throttle operation Sensor is embedded in ECU PCB. It is a contactless type sensor, based on the Magneto-Resistive effect. It measures magnetic field angle variation from a magnet inked to throttle shaft and provides variable voltage depending upon the position of the butterfly valve and hence throttle position can be sensed by the ECU. The sensor signal is used by the ECU as an input to its control system. The ignition timing and fuel injection timing (and potentially other parameters) are altered depending upon the position of the throttle, and also depending on the rate of change of the position.

The ECU uses the throttle valve position to know:
- Engine mode: Idle, Part Throttle, Wide-Open Throttle.
- Air-fuel ratio correction.
- Acceleration/ Deceleration correction.

5. Manifold Absolute Pressure Sensor (MAP)

The Manifold Absolute Pressure sensor provides instantaneous manifold pressure information to the ECU. This is necessary to calculate air density to determine the required fuel metering for optimum combustion and influence the advance or retard of ignition timing. This sensor is in built in the ECU.

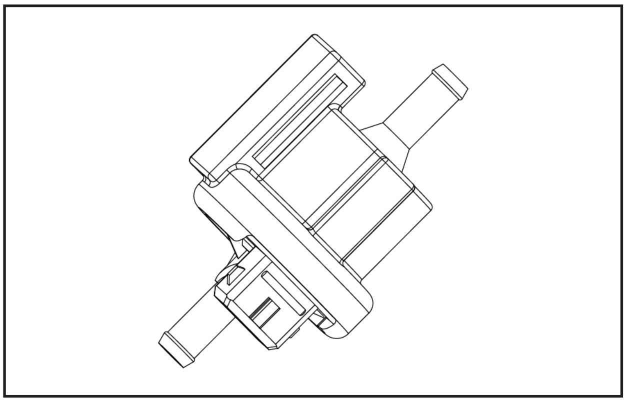
6. Canister Purge Valve

The purge valve is the part of the vehicle Evaporative Emission Control (EVAP) system. The EVAP system prevents fuel vapors in the fuel tank from escaping into the atmosphere. The EVAP system traps fuel vapors from the fuel tank and temporarily stores them in the charcoal canister, see the diagram. When the engine is running under certain conditions, the fuel vapors are purged from the canister and burned inside the engine. The purge valve precisely controls the amount of fuel vapor that is purged from the charcoal canister. It opens only when engine oil is 60º-170º c and HEGO sensor "Controller ON".

Specification:

Valve: Normally Closed

Resistance: 26 ± 2Ω @ 20°C



7. HEGO Sensor/Oxygen Sensor (HEGO / O2)

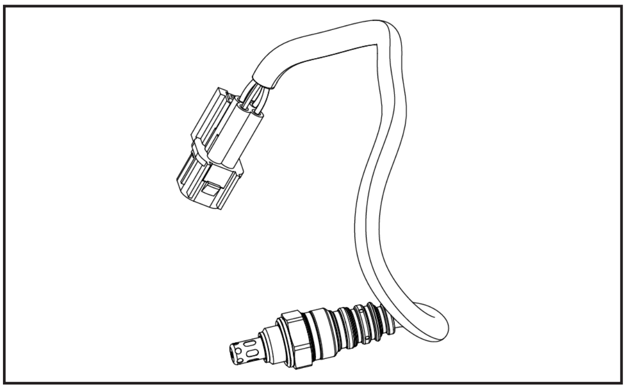
The Heated Exhaust Gas Oxygen sensor detects the presence of oxygen in the exhaust and produces a variable voltage according to the amount of oxygen detected. The O2 sensor provides feedback to the ECU indicating air/fuel ratio in order to achieve a near stoichiometric air/fuel ratio of 14.7 : 1 during closed loop engine operation. The ideal mixture is the amount of fuel needed to make an engine perform as commanded by the ECU.

The HEGO sensor is a voltage generator which is installed upstream from the catalytic converter. The heated exhaust gas oxygen sensor will generate a voltage signal that is characteristic of this ideal stoichiometric ratio. The HEGO sensor operates as a reference-gas sensor, and compares the residual oxygen in the exhaust gas with the oxygen in the reference atmosphere (air circulating inside the sensor). The active sensor ceramic is heated by the internal heating element; thus sensor heating reduces the influence of the exhaust gas temperature on the sensor-ceramic temperature and therefore the temperature-dependent sensor. Reliable signals working temperature from 300ºc to 900ºc maximum.

Specification:

Operating Voltage: 16 V (Max)

Operating temperature: 600ºC to 950ºC



8. Idle Air Control Valve (IAC)

Idle Air Control Valve is basically a stepper motor controlling the bypass air to the engine and helps to idle and cold start the engine without difficulties. The ECU accordingly collects the data from the engine oil temperature and intake air temperature sensors and operates the stepper motor in regulating the engine RPM. This allows the engine's idle speed to be maintained constant. Idle Air Control Valve is in built in the ECU.

9. Secondary Air Injection Solenoid (SAI)

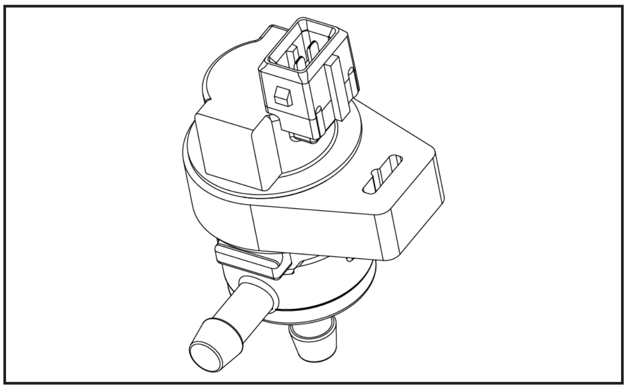
Secondary air injection solenoid is used to reduce the tailpipe emissions by burning the unburnt fuel in the exhaust. The solenoid is connected over the top of the air filter box and has a hose leading to the reed valve located in the exhaust port. During the negative pulses in the exhaust, fresh air is drawn into the exhaust stream thereby creating combustion of unburnt gases. The solenoid is controlled by ECU and pulsed when the operating conditions are met.

Specification:

Valve: Normally Closed

Resistance: $26 \pm 1.8\Omega$ @ 22 to 28°C

Operating Voltage : 8 to 18 V



10. Engine Oil Temperature Sensor (EOT)

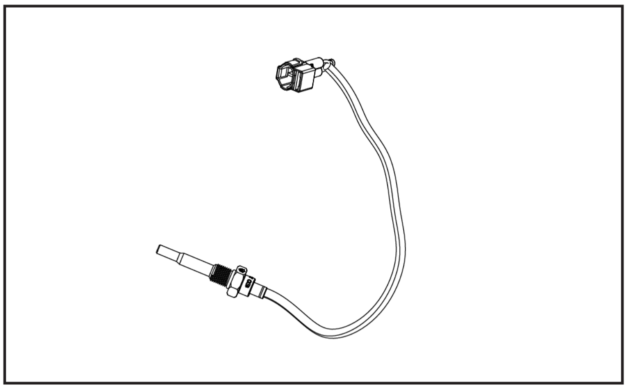
Engine oil temperature sensor is thermistor whose resistance is dependent on temperature. It has a Negative Temperature Coefficient where the resistance decreases with increase in temperature. It gives the average temperature of the engine oil to the ECU for making corrections in the injection quantity, ignition timing and for adjusting the stepper opening for better idle stability. It is mounted in LH of cylinder head.

Specification:

Operating Temperature: -55 to 250°C

Supply Voltage: 5 V

Pin Out Voltage: 3.79 V @ 40°C (Across Pins 19 & 22)



11. Intake Air Temperature Sensor (IAT)

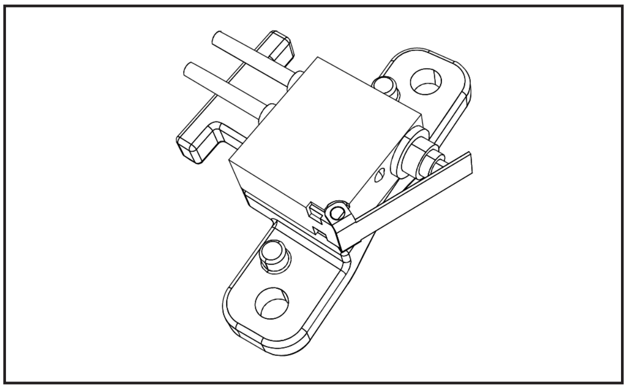
Intake air temperature sensor is also a Negative Temperature Coefficient sensor where the resistance decreases with increase in temperature. It gives the information about ambient air temperature to the ECU for making corrections in the injection quantity and ignition timing. This intake air temperature sensor is in-built in ECU.

NOTE: 1. To meet target emission

2. To meet evaporative emission.

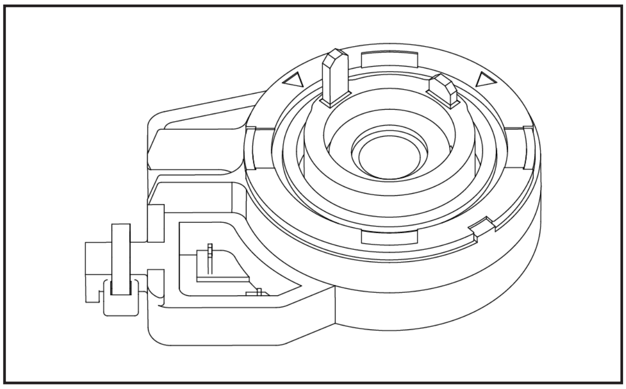
12. Clutch Switch

Clutch switch gives information to the ECU about the clutch status (i.e) engaged or disengaged with the gearbox.
The clutch switch gives digital input to the ECU (i.e) 0 or 1 which will help in starting of the vehicle when the engine is not in neutral gear. It is mounted under the LH switch module at handle bar.



13. Side Stand Switch

Side stand switch prevents the vehicle from starting when the side stand is down and not in neutral gear.
It is rotary type switch, which is directly connected to ECU.



Specification:

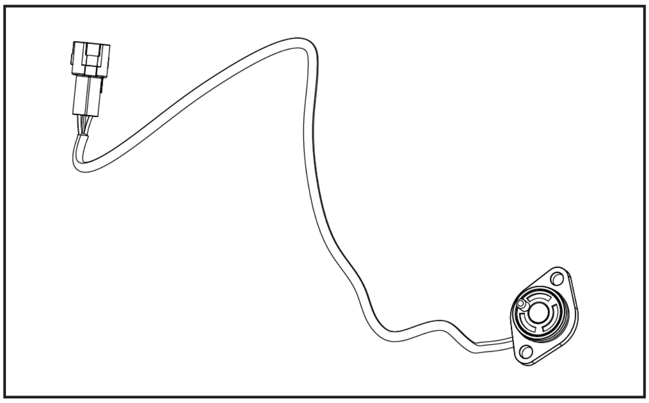
(Across Pins 17 & 1)

Side stand down: 0 V

Side stand up: 12 V

14. Gear Position Sensor (GPS)

Instrument cluster receives the Gear information from Gear position sensor and indicates in the Instrument cluster and also transmits this gear information to ECU through CAN communication.
With this gear data ECU performs drive ability calculations in the ECU.



15. Roll Over Sensor

Roll over sensor is also known as bank angle sensor. This sensor gives signal to the ECU if the vehicle rolls off during any mishap or accident. The ECU then cuts off the supply to the fuel injector and the spark plug thus stalling the vehicle, due to which further major mishap is avoided. This sensor is In-built in the ECU.

Specification:

Banking angle: 50 degrees

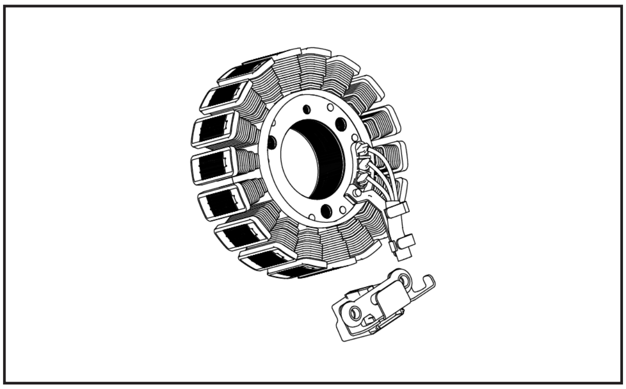
16. Crank Position Sensor (CPS)

It provides an alternating electrical pulse to the ECU, to determine crankshaft speed and TDC position of the piston in compression stroke. This input will help the ECU to optimize both fuel injection as well as Ignition advance required to suit the crankshaft rotation speed (RPM).
In the event throttle is wide open, leading to crankshaft speed above 6850 RPM, the high frequency electrical pulses from the crank position sensor will prompt the ECU to restrict fuel supply so that the crank speed reduces to safe levels. This is a safety aspect to prevent damage to moving engine parts. CPS is located inside the engine cover LH, under the stator coil.

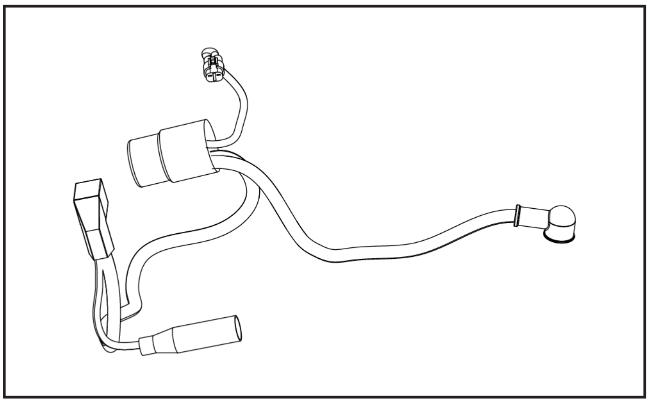
Specification:

Output Voltage: 2.5V to > 85 V AC

Resistance : 215Ω ± 10Ω



17. Starter Motor Relay



Specification:

Operating Voltage: 9 to 16 V

10.1 Engine Management System (EMS)

Dismantling

10.1.1. Engine Control Unit (ECU)

⚠ CAUTION

Before disconnecting ECU from the wiring harness, the battery terminals must be disconnected from the battery.

- Ensure the ignition switch and stop switch are in OFF position.
- Remove the following:
  - Side panel RH (section 6.7.1).
  - Side panel LH (section 6.7.4).
  - Seat from frame (section 6.7.2).
- Disconnect battery terminals (section 11.5.1).
- ECU is main part of EMS and is located in the throttle body.
- ECU cannot be dismantled from the Throttle body, hence has to be replced as a whole assembly.
- Disconnect the coupler **(a)** from the ECU **(b)**.

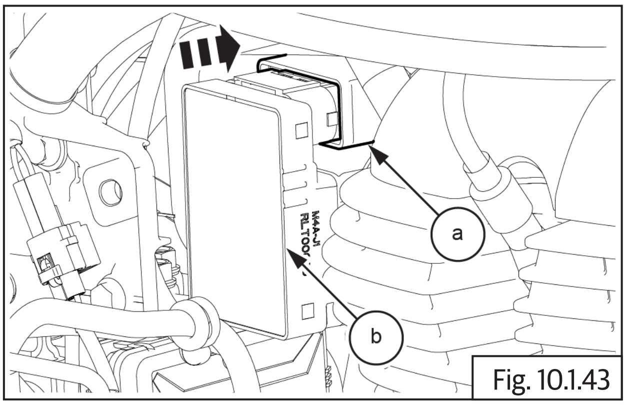


Fig. 10.1.43

- Refer section for throttle body dismantling..

⚠ CAUTION

Ensure locks are fully lifted up and released before disconnecting wiring connectors from ECU.

Ensure locks are handled with care and do not get damaged or broken.

Damaged or broken locks will result in loose connections and cause the ECU to fail.

Storage of ECU

Do's & Don'ts

- Store ECU away from any magnetic forces at it will affect the ECU program software and damage ECU.
- Store ECU in a cool and dry place.
- DO NOT allow moisture to affect the ECU.
- DO NOT wash the ECU with water or any solvent.
- Prevent ECU from any external damages.
- DO NOT drop ECU or allow it to fall as internals will get damaged and render the ECU defective.
- DO NOT keep any heavy or sharp objects on ECU as it will damage internals and render the ECU defective.

10.1.2. Fuel Pump

- Ensure Ignition switch and Engine stop switch are in OFF position
- Remove the following parts:
  - Side panel RH (section 6.7.1).
  - Rider seat (section 6.7.2).
  - Fuel tank assembly (section 7.1.1).

⚠ CAUTION

Ensure the following:

Fuel is drained completely from fuel tank.

Fuel feed and return hoses are disconnected from the fuel rail.

Wiring couplers to fuel pump and low fuel sensor are disconnected.

EVAP hose pipes are disconnected.

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

- Loosen and remove 8 Nos. Hex socket head bolts **(M5) (a)** holding fuel pump **(b)** to tank **(c)**.

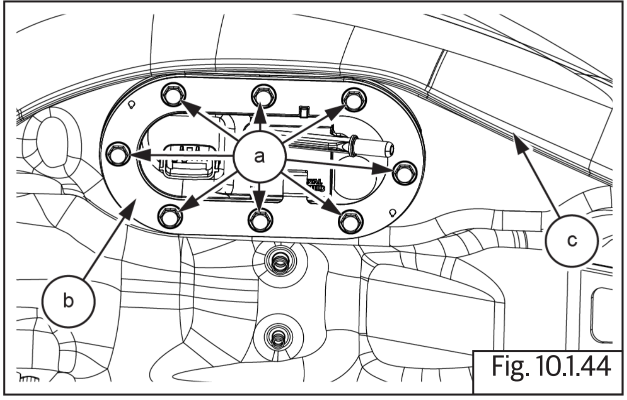


Fig. 10.1.44

8 mm Socket with Ratchet

- Gently pull out the fuel pump **(a)** from fuel tank **(b)**.

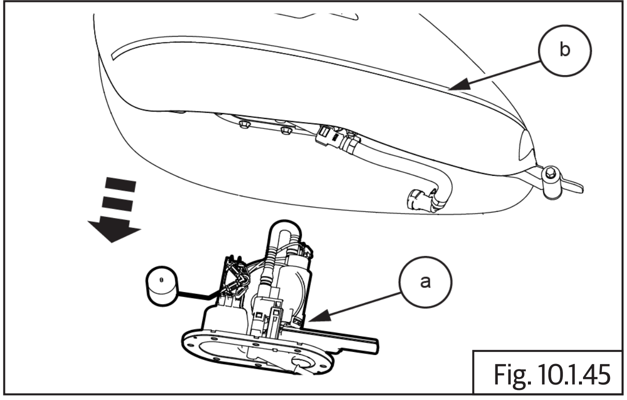
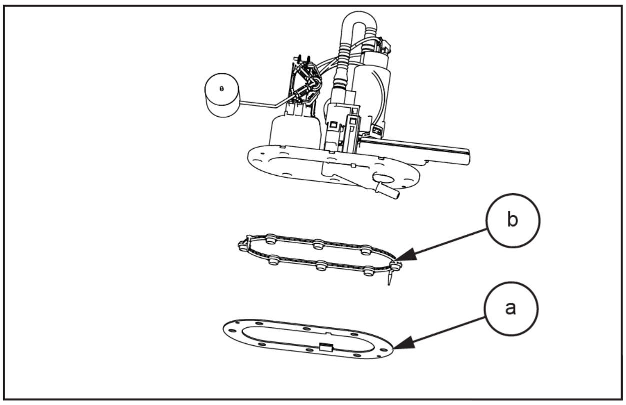


Fig. 10.1.45

- Remove O-rings **(a)** and **(b)** from fuel pump.



10.1.3. Throttle Body Assembly

- Ensure ignition switch and engine stop switch are in OFF position
- Remove the following parts:
  - Side panel RH (section 6.7.8).
  - Rider seat (section 6.7.7).
  - Side panel LH (section 6.7.5).
  - Fuel tank assembly (section 7.1.15).

⚠ CAUTION

Ensure the following:

Fuel is drained completely from fuel tank.

Fuel hoses are disconnected.

Wiring couplers to fuel pump and low fuel sensor are disconnected.

EVAP hose pipes are disconnected.

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

- Remove the following parts:
  - Throttle cable (section 5.1.8).
  - Remove electrical connector from ECU.
  - Rubber hoses connecting to Throttle body from EVAP (section 5.1.11).
- Ensure vacuum hose is removed.
- Loosen wire clips on air filter connection tubes (section 5.1.10).
- Loosen worm clip screw on inlet manifold. (section 5.3.19).

NOTE

- *Ensure screw is sufficiently loosened and the worm clip rotates easily in the groove in the manifold.*

- Gently pull out throttle body from the inlet manifold rubbers along with fuel rail and injectors.

10.1.4. Fuel Injectors

- Disconnect coupler **(a)** from injector.

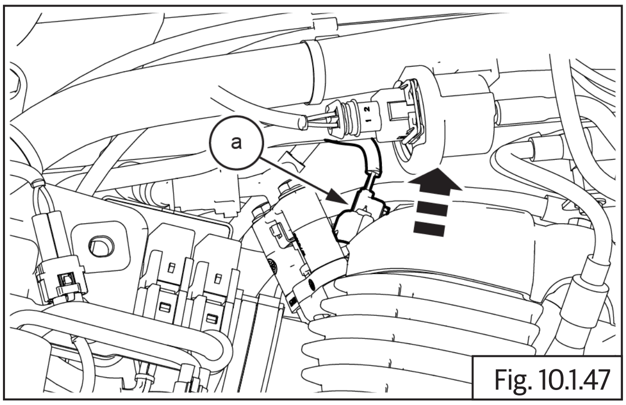


Fig. 10.1.47

- Loosen and remove 2 Nos. Hex flange bolts **(a)** holding from fuel injector **(b)** to cylinder head.

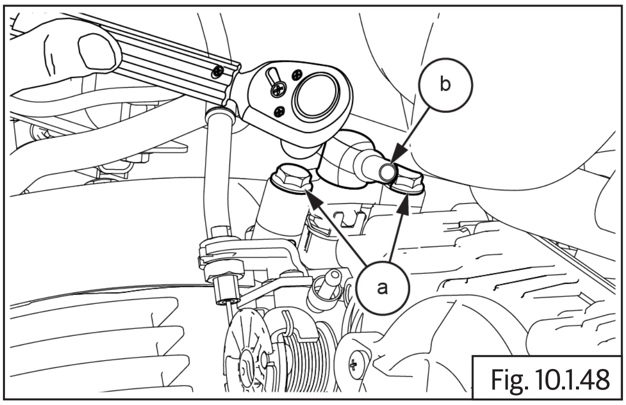


Fig. 10.1.48

	10 mm Socket with Ratchet

- Gently remove injector **(a).**

10.1.5. Engine Oil Temperature Sensor (EOT)

- The EOT **(a)** is located on cylinder head below the exhaust pipe.

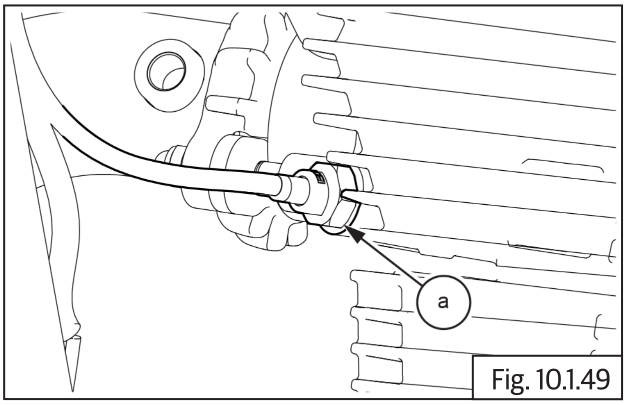


Fig. 10.1.49

NOTE

- *Ensure the engine is cold before dismantling EOT.*
- *Ensure Ignition switch and Engine stop switch are in OFF position.*

CAUTION

Do not remove EOT from cylinder head when the engine is hot.

- Disconnect EOT sensor wiring coupler **(a)** from the main harness **(b)** above cylinder head.

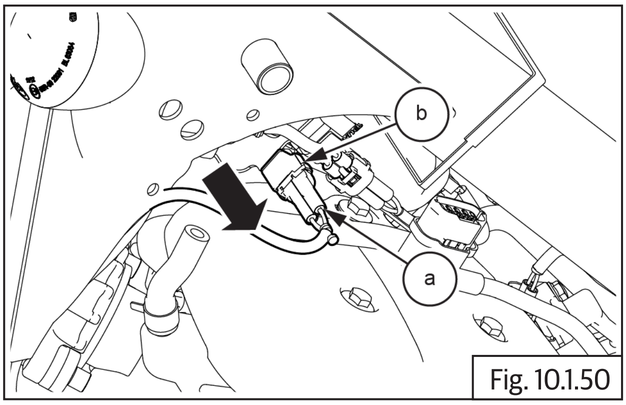


Fig. 10.1.50

- Place a small tray under EOT to collect the oil when it is loosened and removed.
- Insert EOT wiring coupler through a deep grooved ring spanner and locate the spanner on the EOT hex head correctly.
- Gently loosen EOT **(a)** from cylinder head **(b)** and remove along with O-ring **(c)**.

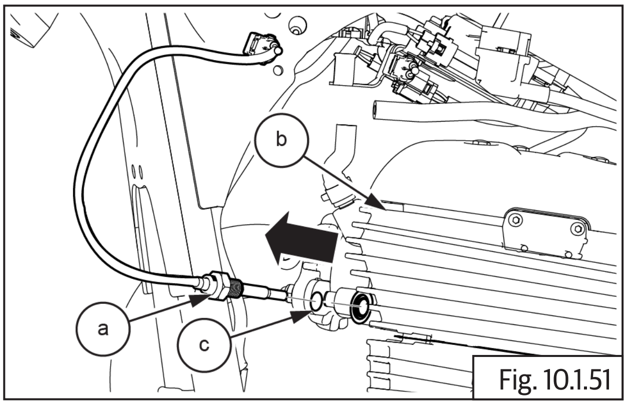


Fig. 10.1.51

🔧	17 mm Deep groove ring spanner

10.1.6. HEGO/Oxygen (O2) Sensor

CAUTION

Do not loosen/remove HEGO (O2) sensor when the exhaust pipes are hot.

WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and is at the same levels of ambient/surrounding temperature whenever working on the engine or exhaust systems.

- The HEGO (O2) sensor **(a)** is located on the exhaust pipe **(b)**.

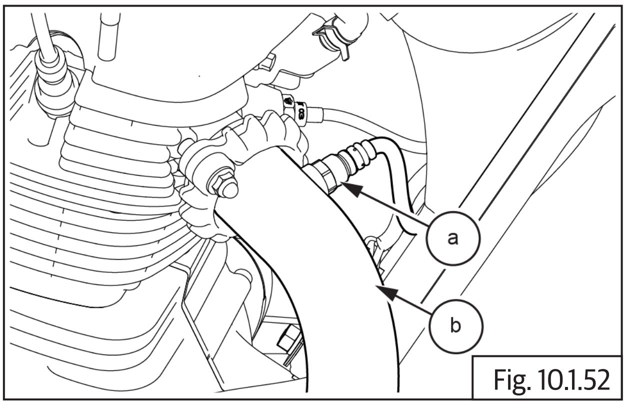


Fig. 10.1.52

- Disconnect HEGO (O2) sensor connector **(a)** from wiring harness located under fuel tank **(b)** .

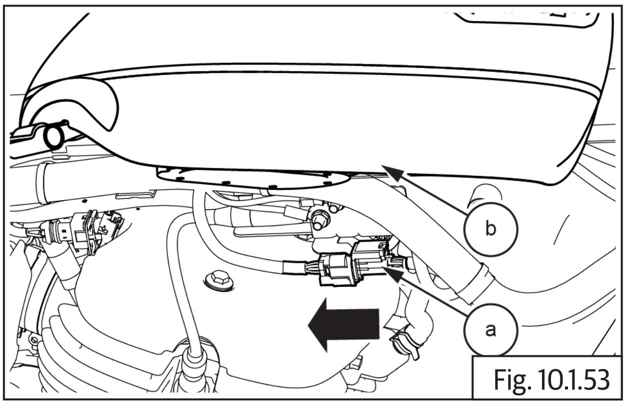


Fig. 10.1.53

- Gently loosen HEGO (O2) sensor **(a)** from exhaust pipe **(b)** and remove along with Copper washer.

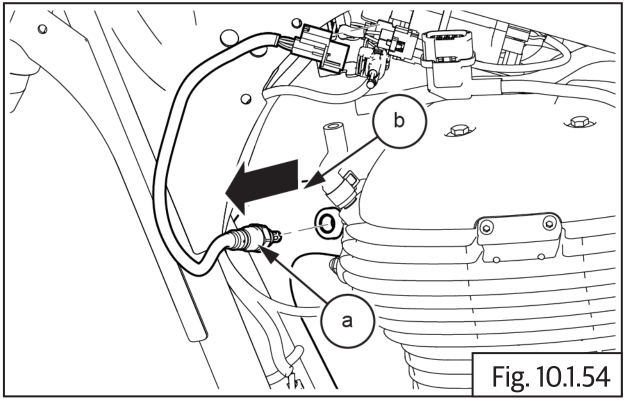


Fig. 10.1.54

🔧	17 mm Deep groove ring spanner

10.1.7. Secondary Air Injection Unit (Solenoid) (SAI)

- The SAI **(a)** is assembled on the top of the cylinder head assembly on the frame.
- Ensure ignition switch and engine stop switch are in "OFF" position.
- Remove the following parts:
  - Side panel RH (section 6.7.1).
  - Rider seat (section 6.7.2).
  - Side panel LH (section 6.7.4).
  - Fuel tank assembly (section 7.1.1).

⚠ CAUTION

Ensure the following:

Wiring couplers to fuel pump and low fuel sensor are disconnected.

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

- Disconnect secondary air injection connector **(a)** from wiring harness connector located above cylinder head assembly to frame.

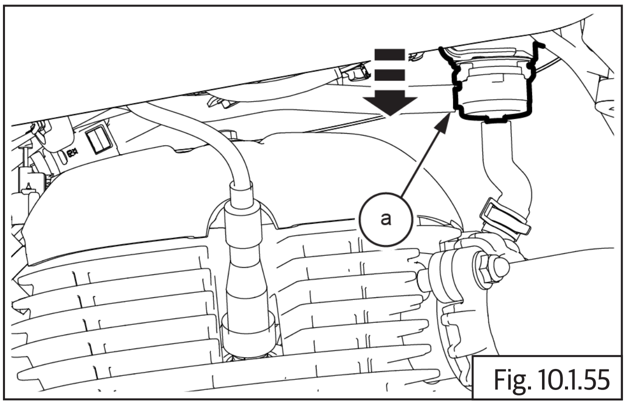


Fig. 10.1.55

- Disconnect coupler **(a)** from SAI **(b)**.

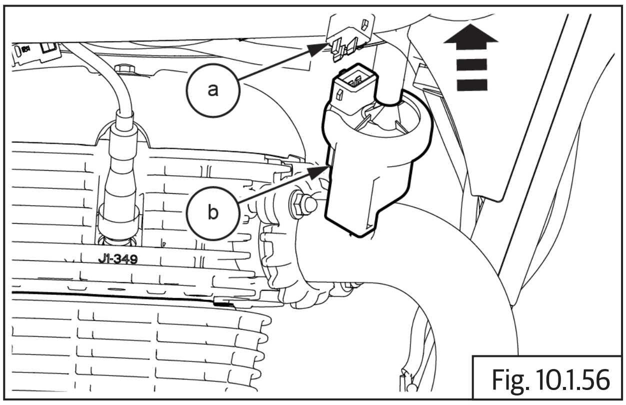


Fig. 10.1.56

- Disconnect reed valve hose **(a)** from SAI **(b)**.

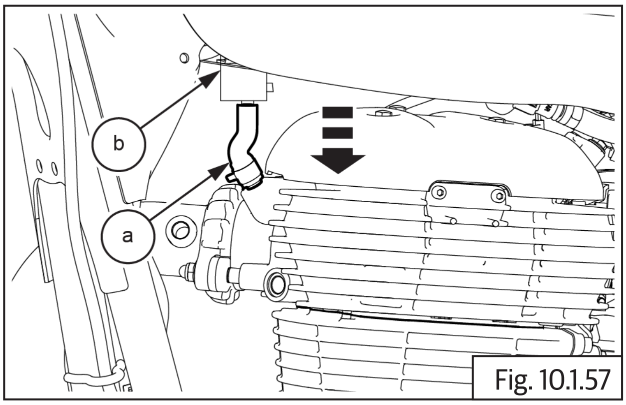


Fig. 10.1.57

- Disconnect air filter box hose **(a)** from SAI **(b)**.

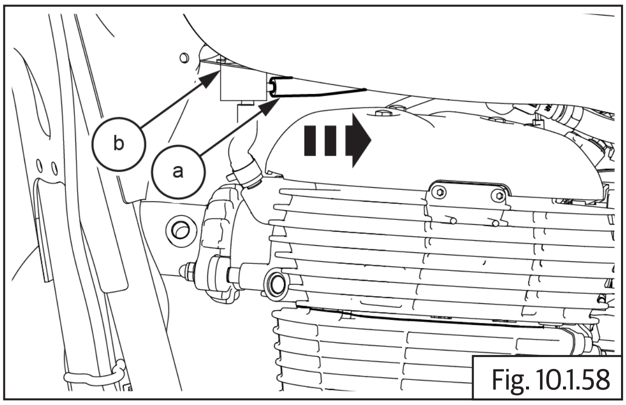


Fig. 10.1.58

- Remove Secondary air injection solenoid..

10.1.8. Purge Valve

- Remove the following parts:
    - Side panel RH (section 6.7.1).
    - Rider seat (section 6.7.2).
    - Side panel LH (section 6.7.4).
- The purge valve **(a)** is part of the EVAP system and is located above the cylinder head to frame.

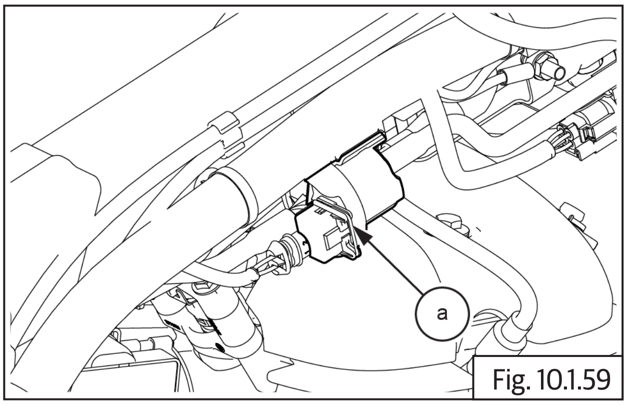


Fig. 10.1.59

- Disconnect hose **(a)** connecting purge valve to throttle body.
- Disconnect hose **(b)** connecting purge valve to canister.

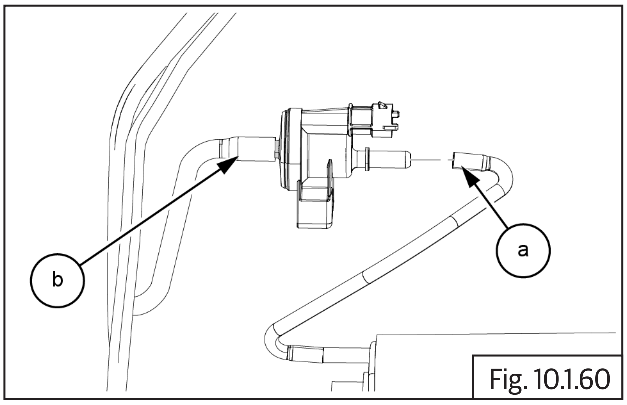


Fig. 10.1.60

- Disconnect wiring coupler **(a)** from purge valve **(b)**.

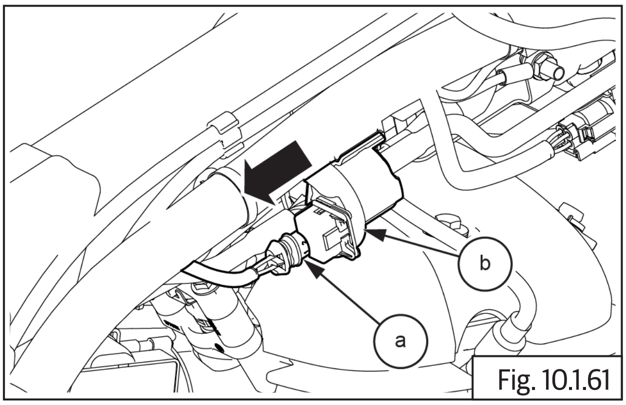


Fig. 10.1.61

- Gently pull out purge valve from bracket.

10.1.9. Ignition Coil

- The Ignition coil **(a)** is located on the frame under fuel tank.

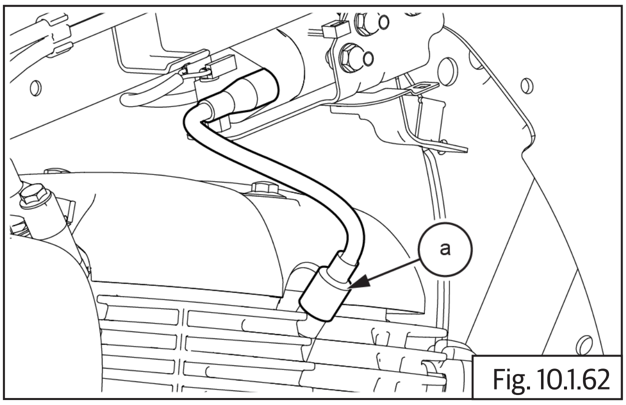


Fig. 10.1.62

- Ensure Ignition switch and Engine stop switch are in "OFF" position.
- Remove the following parts:
  - Side panel RH (section 6.7.1).
  - Rider seat (section 6.7.2).
  - Side panel LH (section 6.7.4).

⚠ WARNING

Gasoline is extremely flammable and highly explosive. Improper handling can lead to fatal accident or serious injury.

- Disconnect spark plug suppressor cap from spark plug **(a)**.

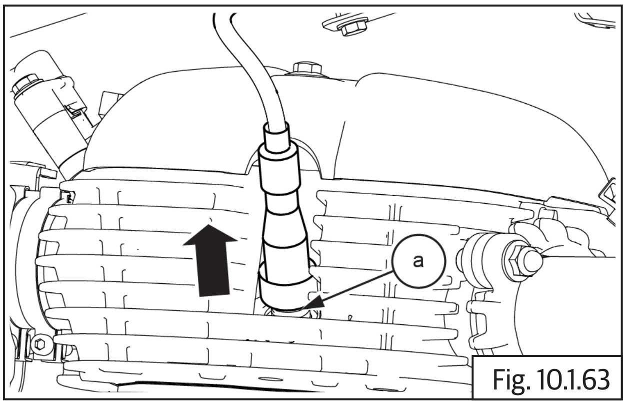


Fig. 10.1.63

- Disconnect wiring couplers **(a)** from the ignition coil.

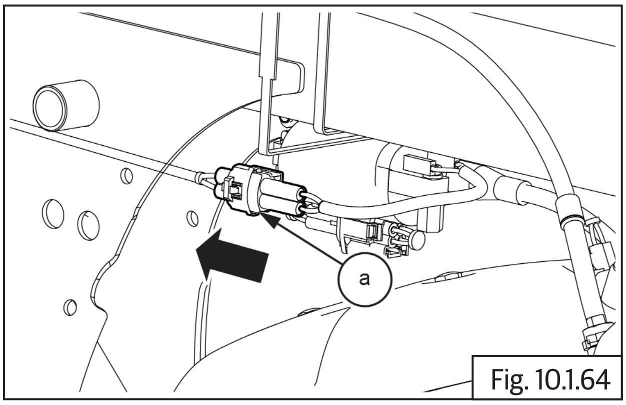


Fig. 10.1.64

- Loosen and remove. Hex head bolts **(M6) (a)** from main frame LH **(b)**.

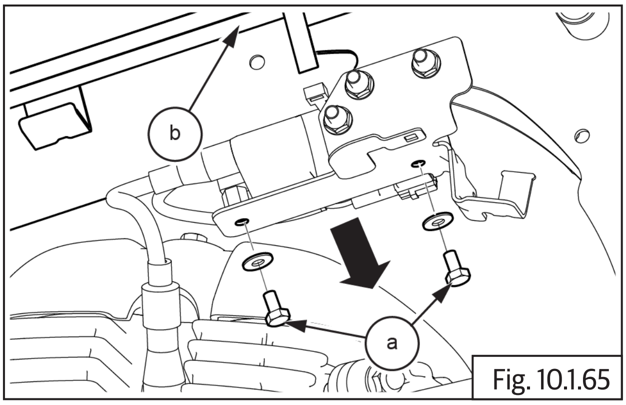


Fig. 10.1.65

10 mm Socket with Ratchet

- Gently slide out Ignition coil **(a)** from frame and remove along HT cables **(b)**.

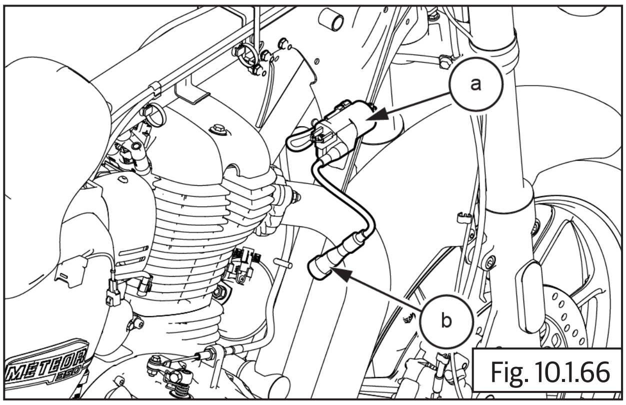


Fig. 10.1.66

10.1.10 Crank Position Sensor

- The crank position sensor **(a)** is located inside the engine cover LH and attached to the stator coil.

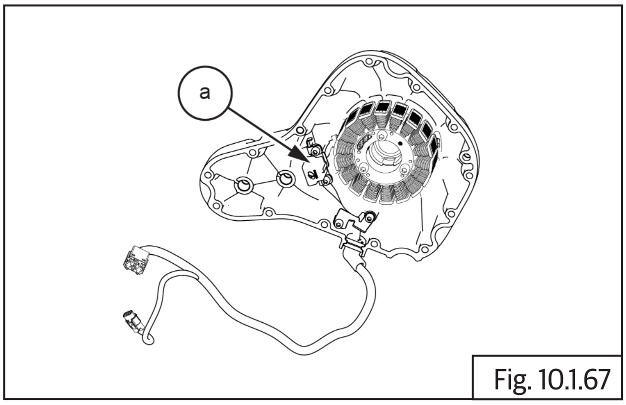


Fig. 10.1.67

- Ensure Ignition switch and Engine stop switch are in "OFF" position.
- Disconnect wiring coupler **(a)** of stator from main wiring harness.

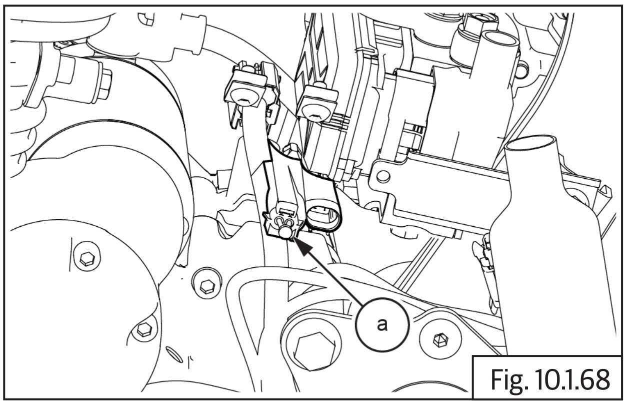


Fig. 10.1.68

- Remove FD sprocket cover (section 5.1.24).
- Remove cover LH from Engine (section 5.1.34).
- Loosen and remove 3 Nos. Hex socket head screws **(M6) (a)** holding stator coil.

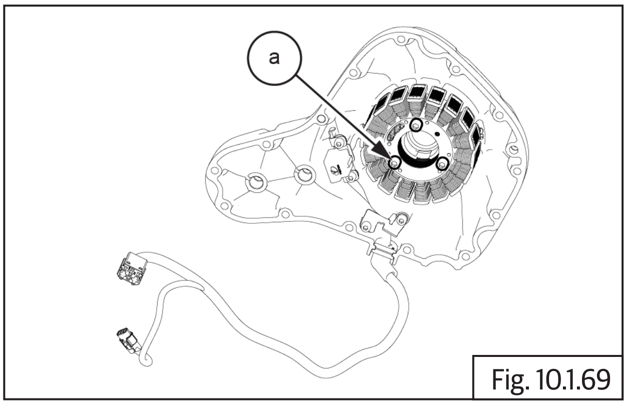


Fig. 10.1.69

5 mm Socket with Ratchet

- Loosen and remove 2 Nos. Hex socket head bolts **(M5) (a)** holding crankshaft position sensor guide plate to cover LH.

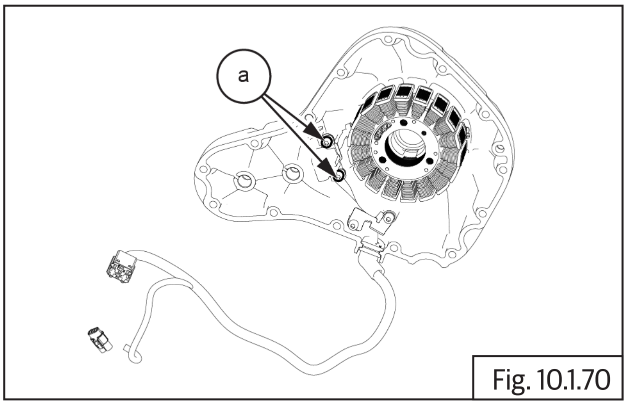


Fig. 10.1.70

4 mm Socket with Ratchet

- Gently slide out wiring harness, rubber grommet **(a)** from the slot in cover LH and remove stator coil along with crank shaft position sensor **(b)**.

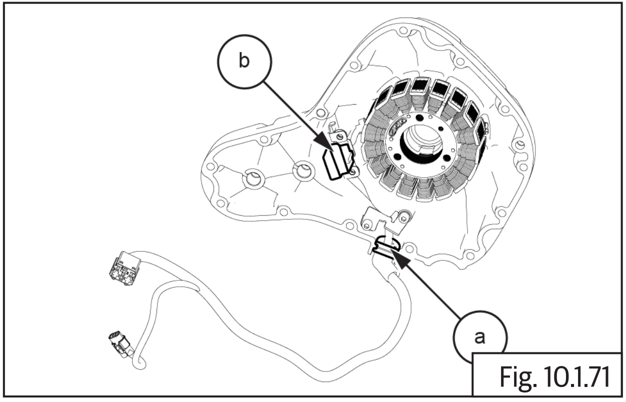


Fig. 10.1.71

10.1.17. Gear Position Sensor

- The gear position sensor **(a)** is located on the crankcase LH before FD sprocket.

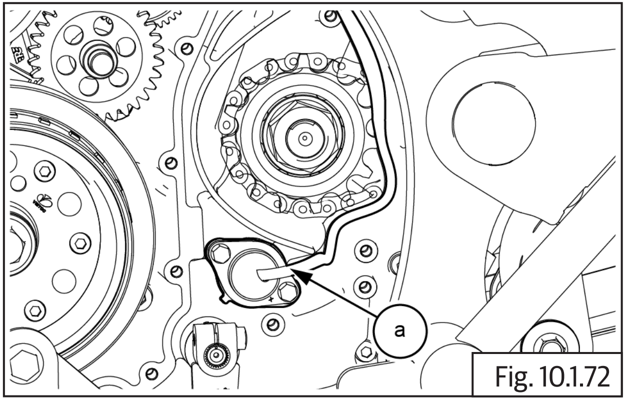


Fig. 10.1.72

- Ensure Ignition switch and engine stop switch are in OFF position.
- Disconnect wiring coupler **(a)** of gear position sensor from main wiring harness **(b)**.

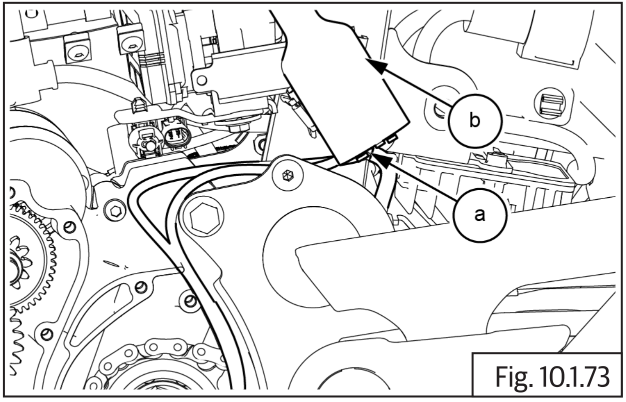


Fig. 10.1.73

- Remove FD sprocket cover (section 5.1.24).
- Loosen and remove 2 Nos. Hex head bolts **(M6)** **(a)** holding the gear position sensor to crankcase LH.
- Gently tap Gear Position Sensor and remove along with O-ring.

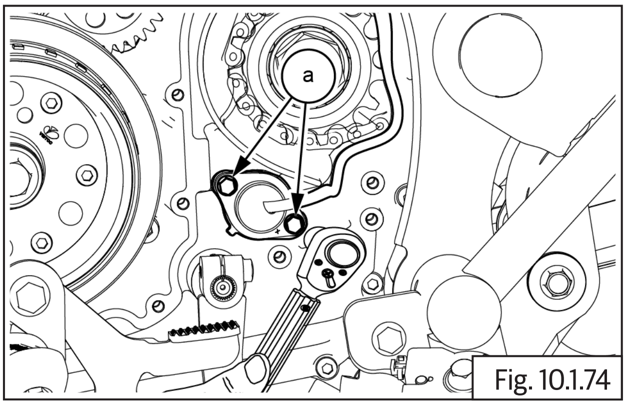


Fig. 10.1.74

	10 mm Socket with Ratchet

- Remove cable bracket **(a)** and gently pull out gear position sensor from crankcase LH.

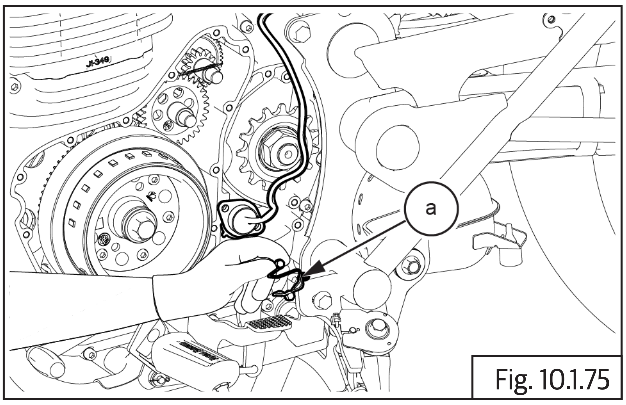


Fig. 10.1.75

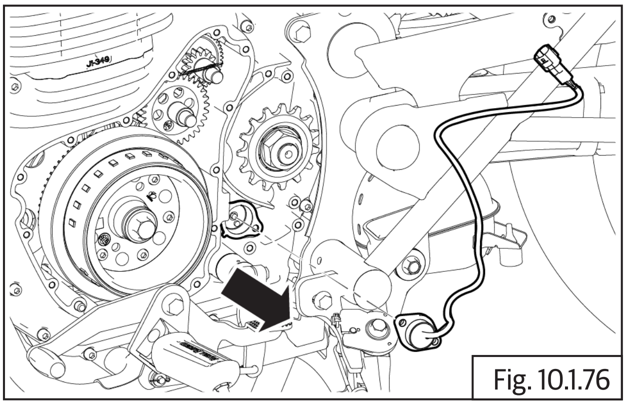


Fig. 10.1.76

10.1.18. Clutch Switch

- Remove headlamp assembly (section 11.1.1).
- Disconnect clutch switch connector **(a)**.

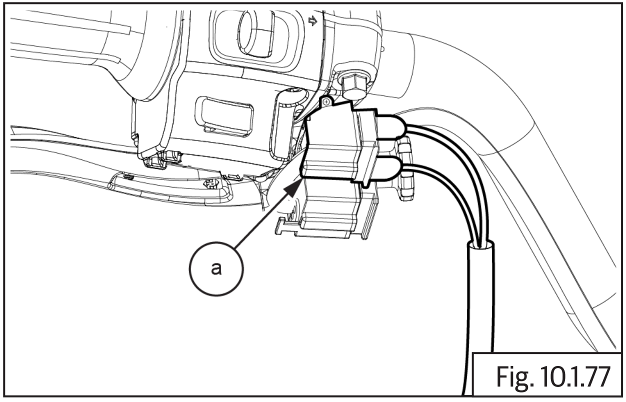


Fig. 10.1.77

- Loosen and remove 2 Nos of screws **(a)** from clutch lever **(b)**.

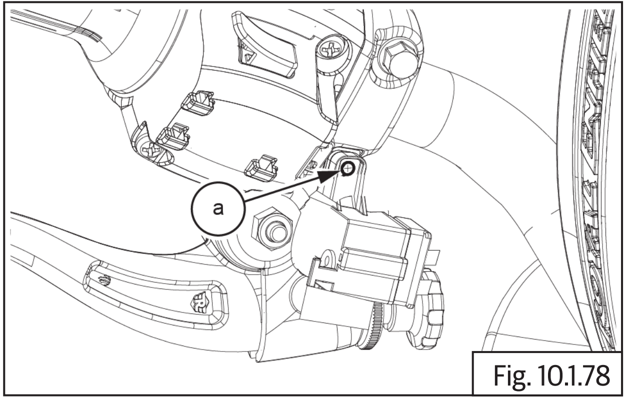


Fig. 10.1.78

🔧	Screw Driver (+)

10.1.19. Side Stand Switch

- Place the vehicle in main stand.

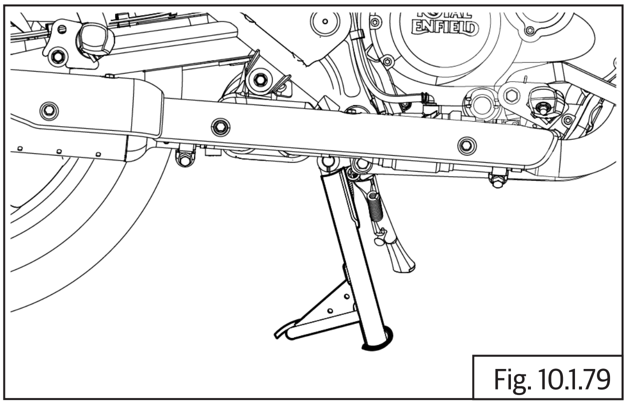


Fig. 10.1.79

- Disconnect side stand connector **(a)** from wiring harness located behind engine .

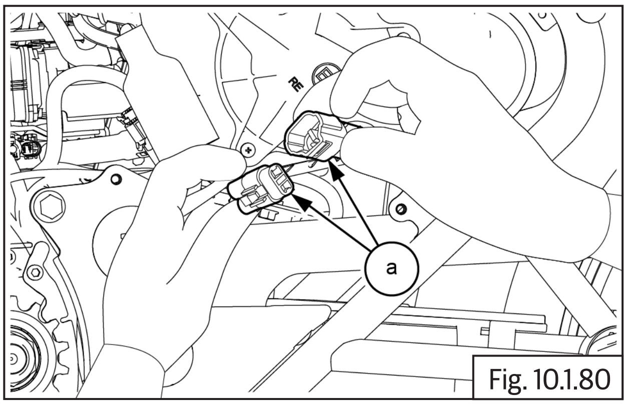


Fig. 10.1.80

- Release the side stand.
- Loosen and remove Hex socket head cap screw **(M6) (a)** from side stand switch located on side stand **(b)**.

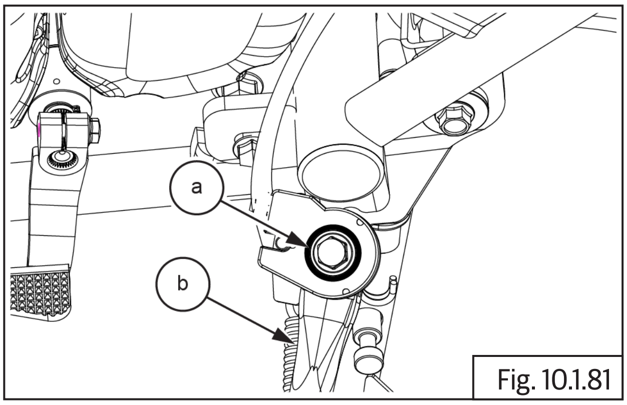


Fig. 10.1.81

🔧	10 mm socket With Ratchet

- Remove side stand switch **(a)**.

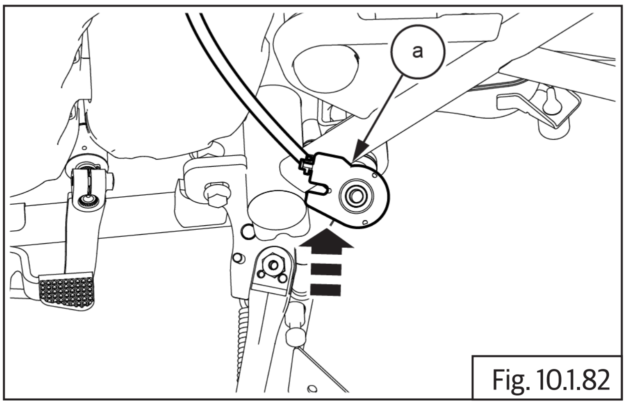


Fig. 10.1.82

10.1.20. Starter Motor Solenoid

- Remove the following parts:
  - Rear wheel (section 6.8.3).
  - Rear mudguard in fill cover (section 6.6.7).
- Locate solenoid connectors below battery tray, ensure ignition off.
- Disconnect starter solenoid connectors **(a)** from wiring harness located below battery tray.

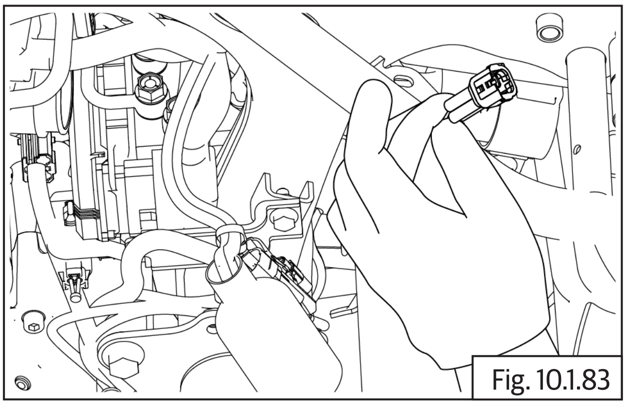


Fig. 10.1.83

- Gently slide and remove solenoid coil from battery tray bracket.

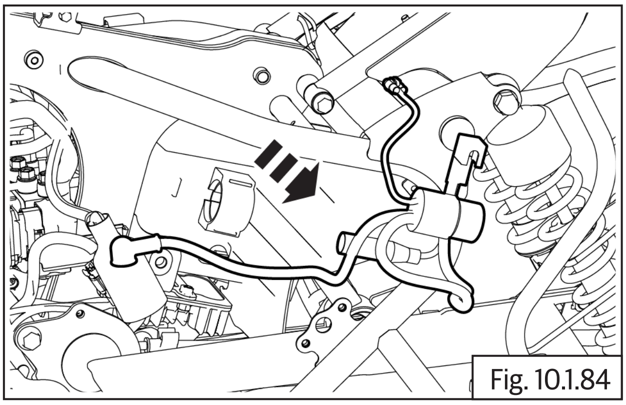


Fig. 10.1.84

Assembly

10.1.21. Engine Control Unit (ECU)

⚠ CAUTION

Before assembling any part of the EMS, the Ignition switch and Engine stop switch MUST be in OFF position

Before connecting ECU into wiring harness, the battery terminals must be disconnected from the battery.

- Insert throttle body **(a)** into intake manifold flange **(b)**

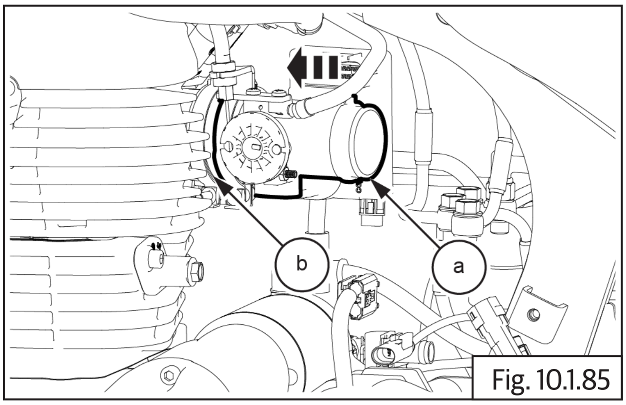


Fig. 10.1.85

- Tighten lock clip **(a)**.

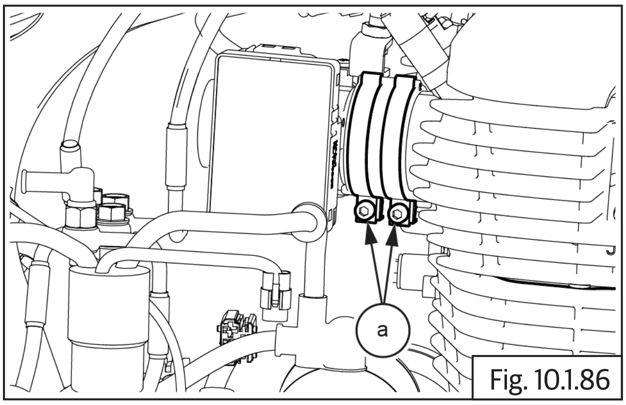


Fig. 10.1.86

🔧	4 mm Allen socket With Ratchet

- Insert throttle body rear end in the air box opening.

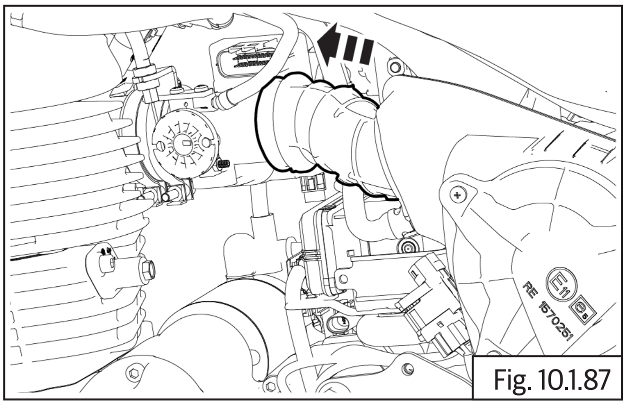


Fig. 10.1.87

- Tighten the lock clip **(a)**.

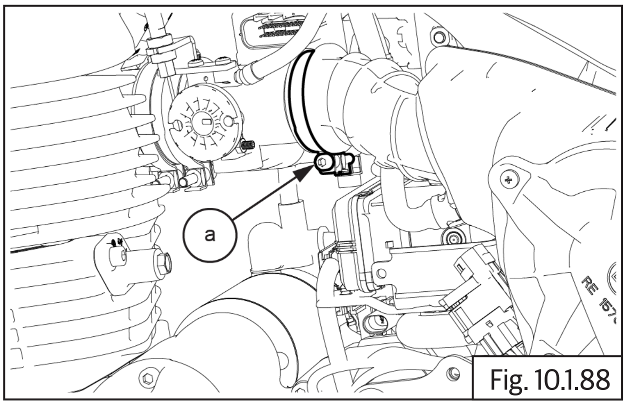


Fig. 10.1.88

- Connect wiring harness coupler **(a)** to ECU **(b)**.

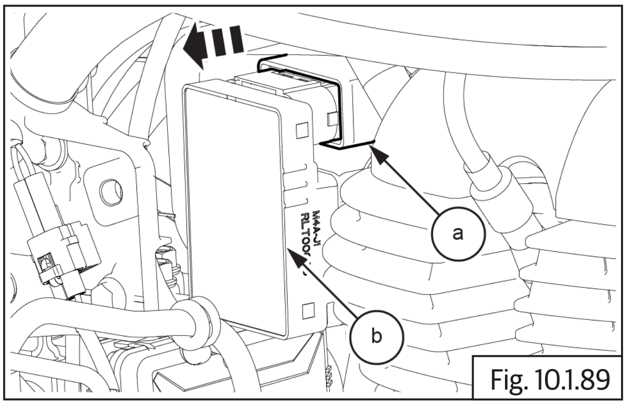


Fig. 10.1.89

- Connect battery terminals.
- Assemble rider seat (section 6.7.7).
- Assemble side panel RH (section 6.7.8).

10.1.22. Fuel Pump

- Ensure Ignition switch and engine stop switch are in "OFF" position.
- Gently insert fuel pump **(a)** from fuel tank **(b)** along with O-ring.

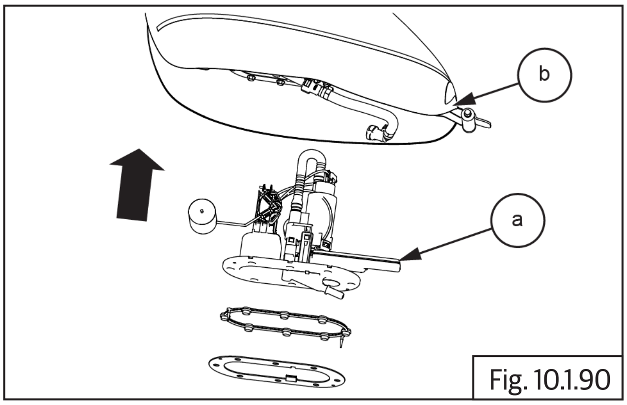


Fig. 10.1.90

- Locate and tighten 6 Nos. Hex socket head bolts **(M5) (a)** holding fuel pump **(b)** to fuel tank **(c)**.

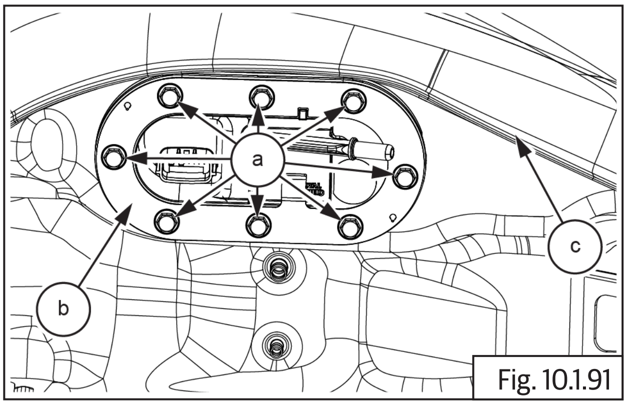


Fig. 10.1.91

🔧	10 mm socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Assemble fuel tank assembly (section 7.1.15).

⚠ CAUTION

Ensure the following:

Fuel is refilled into fuel tank.

Fuel feed and return hoses are connected into fuel rail.

Wiring couplers to fuel pump and low fuel sensor are connected.

EVAP hose pipes are connected.

Water drain hose are connected.

⚠ WARNING

Gasoline is extremely flammable.

- Assemble rider seat (section 6.7.7).
- Assemble side panel RH (section 6.7.8).

10.1.23. Fuel injectors

- Fuel injectors are located on the intake manifold.
- Ensure the O-rings **(a)** and **(b)**.

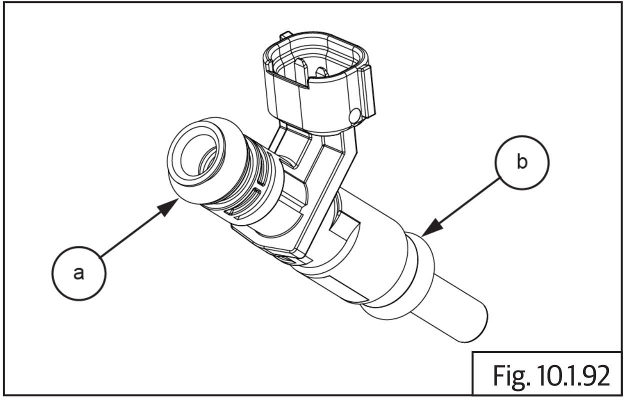


Fig. 10.1.92

- Gently assemble injectors **(a)** into manifold **(b)** along with upper and lower O-rings .

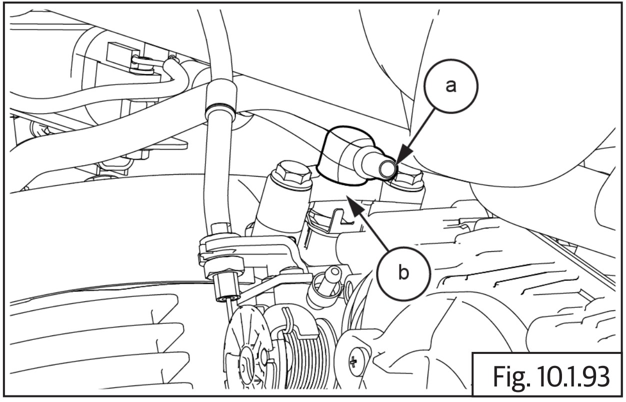


Fig. 10.1.93

- Locate and tighten 2 Nos. Hex soc bolts **(M5)** **(a)** into injector mounting.

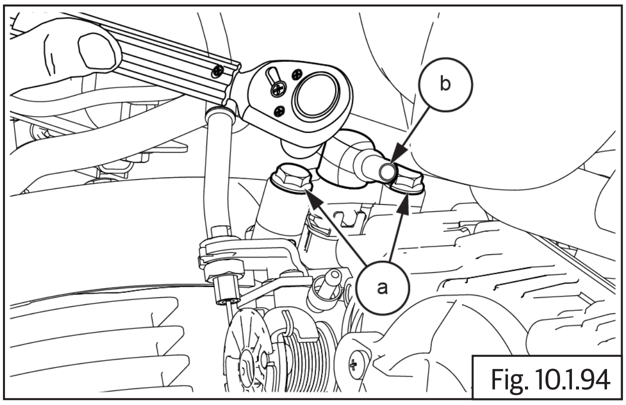


Fig. 10.1.94

🔧	8 mm socket with Ratchet
Torque	8-10 N-m/0.8-1.0 kgf-m

- Assemble throttle body (section 5.2.31).

⚠ CAUTION

Ensure the following:

Fuel is refilled into fuel tank.

Fuel feed and return hoses are connected into fuel rail.

Wiring couplers to fuel pump and low fuel sensor are connected.

EVAP hose pipes are connected.

Water drain hose are connected.

- Assemble the following parts:
  - Fuel tank (section 7.1.15).
  - Rider seat (section 6.7.7).
  - RH side cover (section 6.7.8).

10.1.28. Engine Oil Temperature Sensor (EOT)

- Locate EOT sensor **(a)** along with O-ring **(b)** into engine head assembly **(c)**.

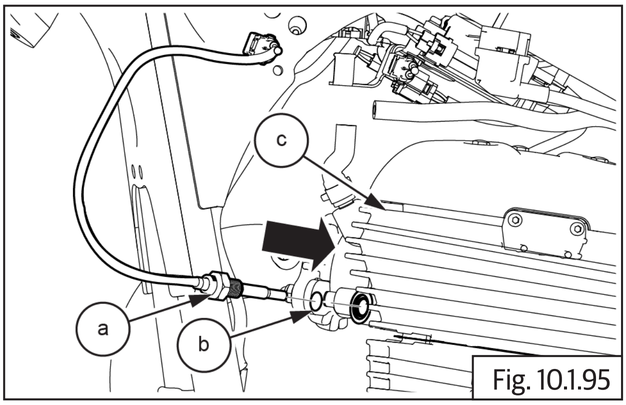


Fig. 10.1.95

- Tighten EOT sensor Hex head **(M17) (a)** into engine head assembly **(b)**.

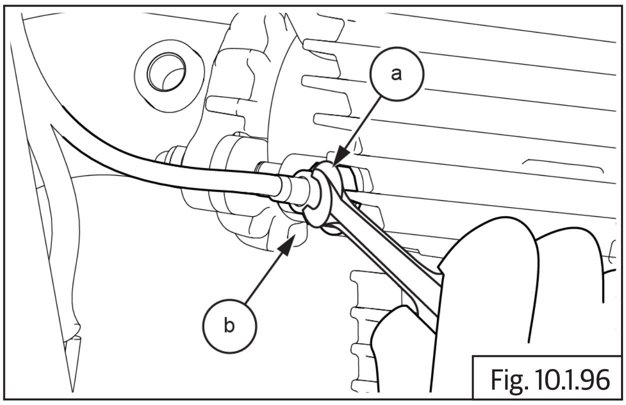


Fig. 10.1.96

🔧	17 mm Deep groove spanner
Torque	8-10 N-m/0.8-1.0 kgf-m

- Connect EOT sensor connector **(a)** into wiring harness **(b)** above cylinder head.
- Ensure connector is locked and wire is routed correctly.

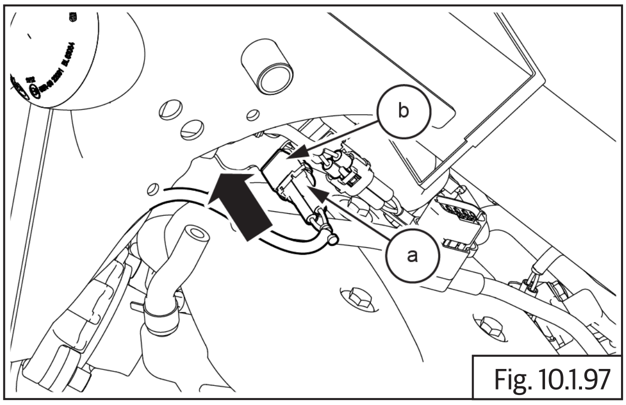


Fig. 10.1.97

10.1.29. HEGO (O2) Sensor

- The HEGO sensor are located on the exhaust pipes near the cylinder head.

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and is at the same levels of ambient/surrounding temperature, whenever working on the engine or exhaust systems.

NOTE

- *Ensure the engine/exhaust is cold before assembling the HEGO (O2) sensors.*
- *Ensure Ignition switch and Engine stop switch are in OFF position.*

- Locate HEGO/O2 sensor on the exhaust pipe and tighten.

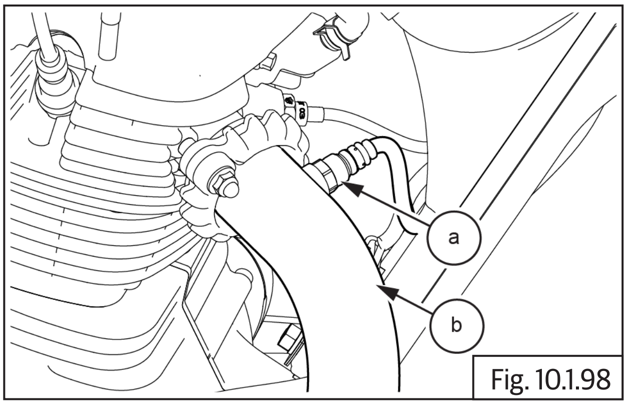


Fig. 10.1.98

🔧	17 mm Deep groove spanner

- Connect HEGO sensor connector **(a)** from wiring harness located near ignition coil assembly below fuel tank.

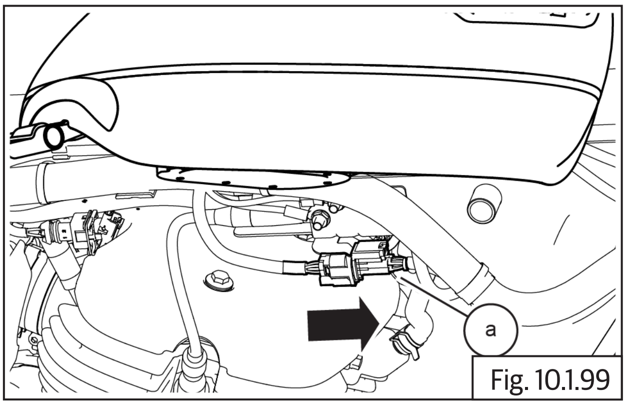


Fig. 10.1.99

10.1.31. Secondary Air Injection Unit (SAI) (Solenoid)

- Ensure Ignition switch and Engine stop switch are in OFF position.
- The SAI is assembled on the frame above cylinder head.
- Connect hose **(a)** from air filter box into SAI **(b)**.

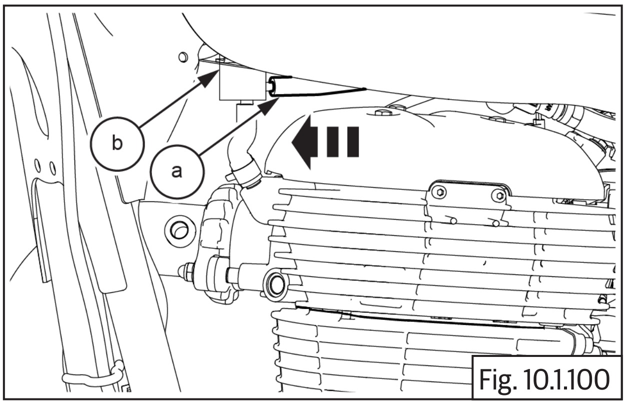


Fig. 10.1.100

- Connect reed valve hose **(a)** to SAI **(b)**.

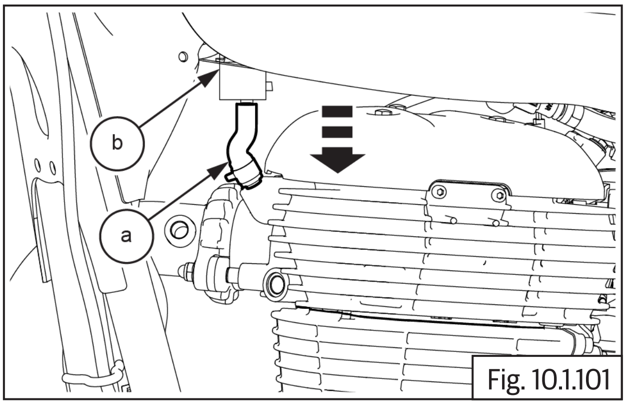


Fig. 10.1.101

- Connect wiring harness coupler **(a)** into SAI **(b)**.

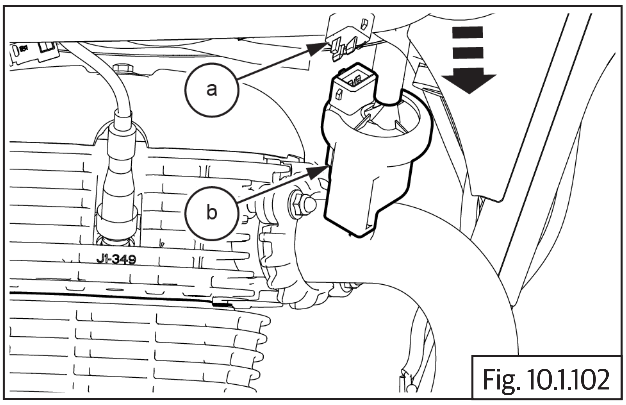


Fig. 10.1.102

- Locate SAI **(a)** into frame .

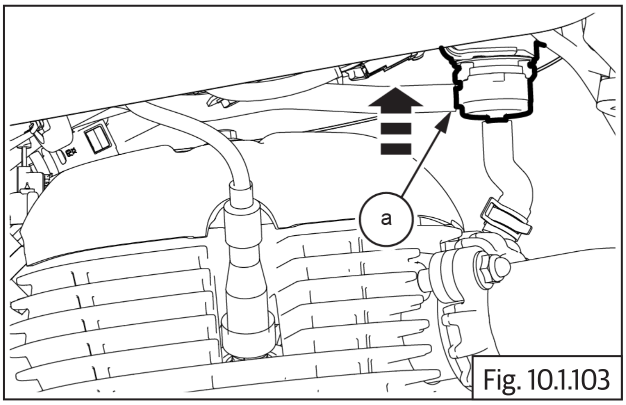


Fig. 10.1.103

- Assemble fuel tank assembly (section 7.1.15).

CAUTION

Ensure the following:

Fuel is refilled into fuel tank.

Fuel feed and return hoses are connected into fuel rail.

Wiring couplers to fuel pump and low fuel sensor are connected.

EVAP hose pipes are connected.

Water drain hoses are connected.

WARNING

Gasoline is extremely flammable and highly explosive. Please handle with care. Improper handling can lead to fatal accident or serious injury. Always drain/fill fuel only in a well ventilated area.

Ensure there is no scope for flames or sparks near by while draining/filling fuel.

- Assemble the following parts:
  - Side panel LH (section 6.7.5).
  - Rider seat (section 6.7.7).

10.1.32. Purge Valve

- Locate and install EVAP purge control valve into frame.
- Connect the inlet **(a)** and outlet **(b)** hoses to EVAP purge control valve.
- Connect the electrical connector **(c)** to EVAP purge control valve.

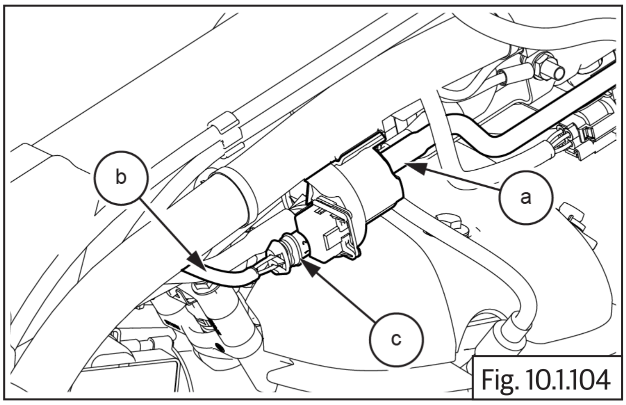


Fig. 10.1.104

- Assembly the following parts:
  - Side panel LH (section 6.7.5)
  - Rider seat (section 6.7.7)..
  - Side panel RH (section 6.7.8).

10.1.34. Ignition Coil

- Assemble ignition coil **(a)** into frame **(b)**.
- Insert and tighten 2 Nos. hex soc bolts **(M6)** **(a)** into ignition coil **(b)**.

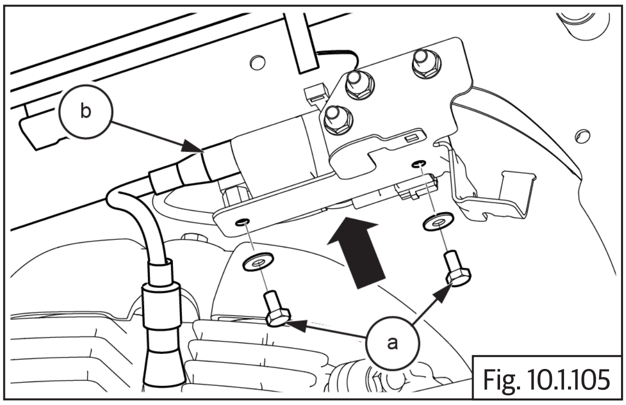


Fig. 10.1.105

🔧	10mm Socket with Ratchet.

- Connect ignition coil connector **(a)** from wiring harness **(b)** located below fuel tank.

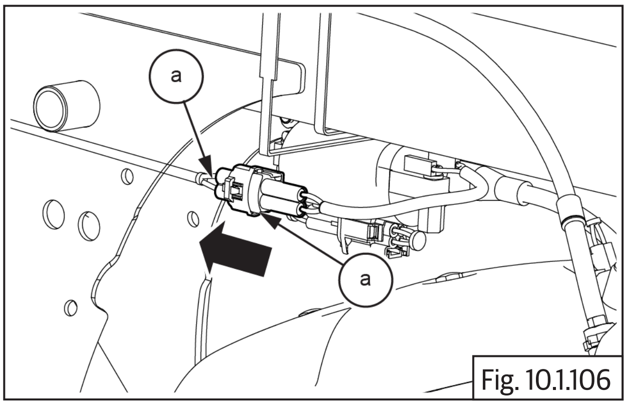


Fig. 10.1.106

- Gently insert Spark plug suppressor cap **(a)** into spark plug **(b)**.

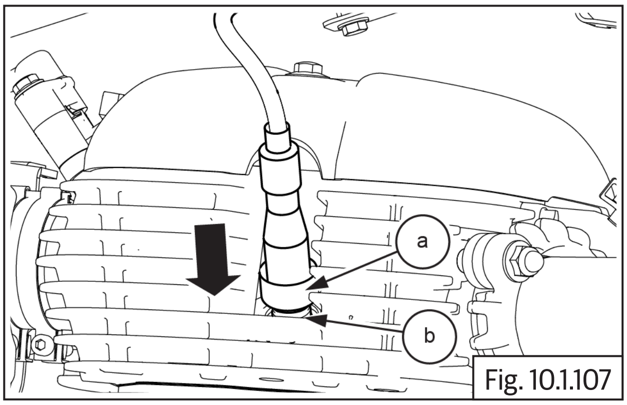


Fig. 10.1.107

- Assemble fuel tank (section 7.1.15).

⚠ CAUTION

Ensure the following:

Wiring couplers to fuel pump and low fuel sensor are connected.

EVAP hose pipes are connected.

Water drain hose are connected.

⚠ WARNING

Gasoline is extremely flammable.

- Assemble rider seat Assembly (section 6.7.7).
- Assemble side panel RH (section 6.7.8).

10.1.35. Crank Position Sensor

- The crank position sensor is located inside the engine cover LH and attached to the stator coil.
- Locate starter coil along with crank shaft position sensor wire assembly **(a)** into cover LH **(b)**.

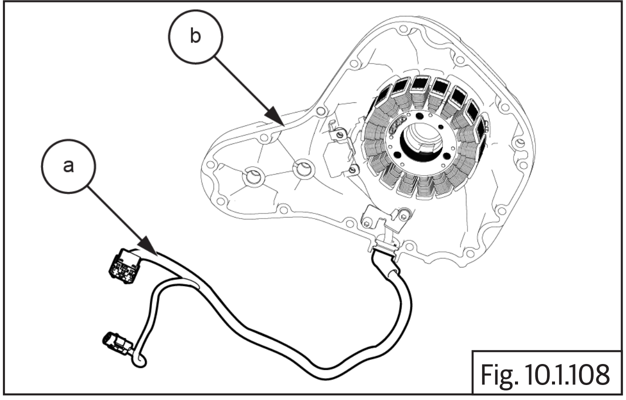


Fig. 10.1.108

- Locket and tighten 2 Nos Hex socket head screws **(M5) (a)** into guide plate **(b)**.

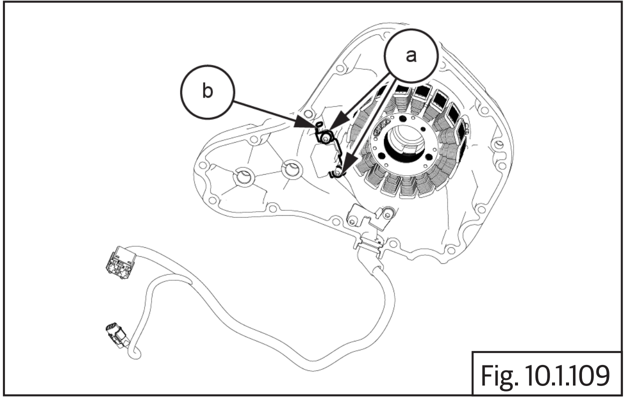


Fig. 10.1.109

🔧	4 mm Allen key with Ratchet
Torque	8-10 N-m/0.8-1.0 kgf-m

- Locate and tighten 3 Nos. Hex socket head screws **(M5) (a)** into LH cover that hold starter coil **(b)**.

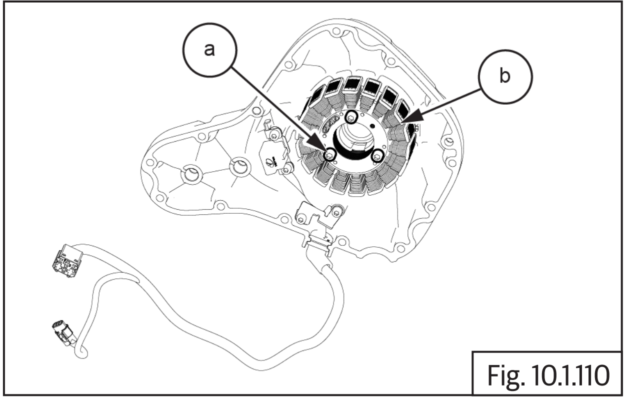


Fig. 10.1.110

🔧	5 mm Allen key with Ratchet
Torque	8-10 N-m/0.8-1.0 kgf-m

- Locate crank shaft position sensor and wiring harness behind engine on RH, near RR module.
- Connect crank position sensor connector **(a)** to harness connector.
- Ensure the wiring harness strapped properly.

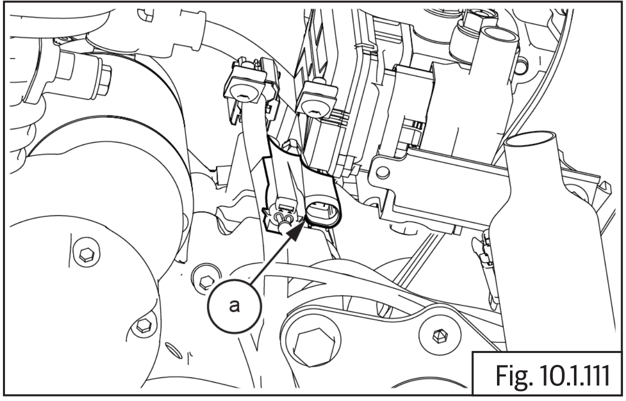


Fig. 10.1.111

- Assemble the following parts:
  - FD sprocket cover (Section 5.2.54).
  - Cover LH from Engine Refer (Section 5.2.45).
  - Fill engine oil.

10.1.36. Gear Position Sensor

- The gear position sensor is located on the crankcase LH before FD sprocket
- Ensure Ignition switch and Engine stop switch are in OFF position.
- Gently locate gear position sensor **(a)** below FD sprocket.

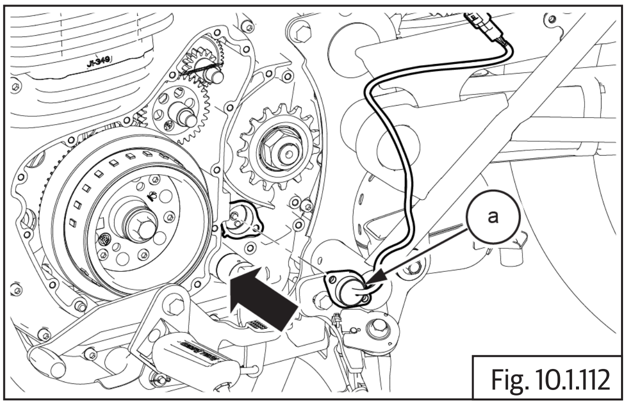


Fig. 10.1.112

- Insert and tighten 2 Nos. Hex head bolts **(M6)** located below FD sprocket.

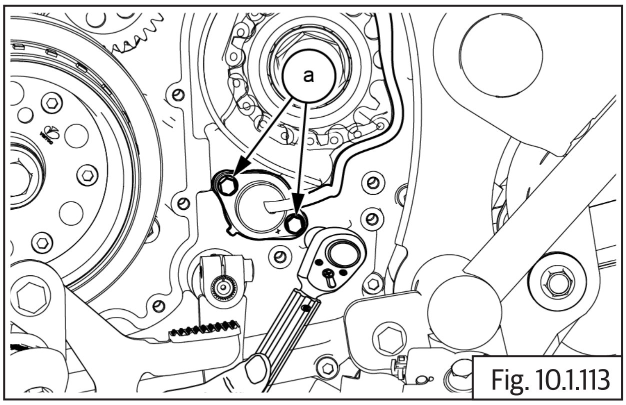


Fig. 10.1.113

🔧	8 mm Allen socket With Ratchet
Torque	8-10 N-m/0.8-1.0 kgf-m

- Connect gear position sensor connector **(a)** to wiring harness connector located on rear side of engine **(b)**.
- Ensure connector is locked properly and wiring is routed correctly.
- Assemble FD sprocket cover (Section 5.4.12).

10.1.37. Clutch Switch

- Locate and tighten 2 Nos of screws **(a)** into clutch lever **(b)**.

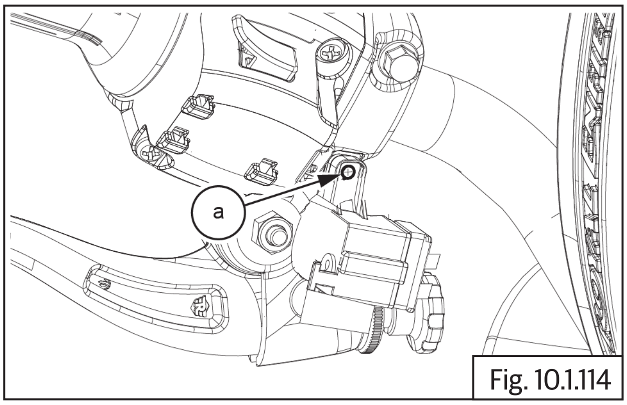


Fig. 10.1.114

🔧	Screw Driver (+)

- Connect connectors **(b)** into clutch switch on handlebar LH **(a)**.

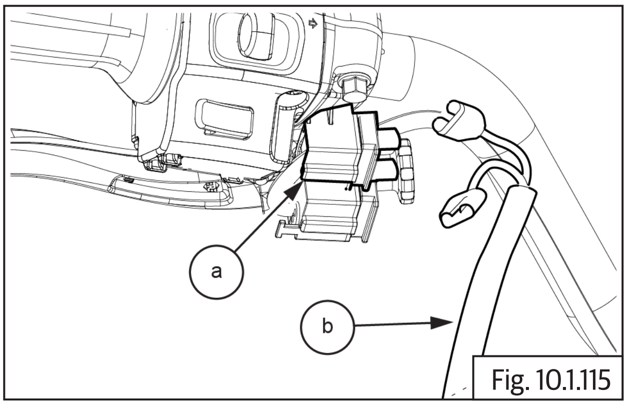


Fig. 10.1.115

- Assemble headlamp assembly (section 11.12.8).

10.1.38. Side Stand Switch

⚠ CAUTION

Ensure the motorcycle is upright on a firm and flat surface.

- Ensure vehicle is placed in main stand

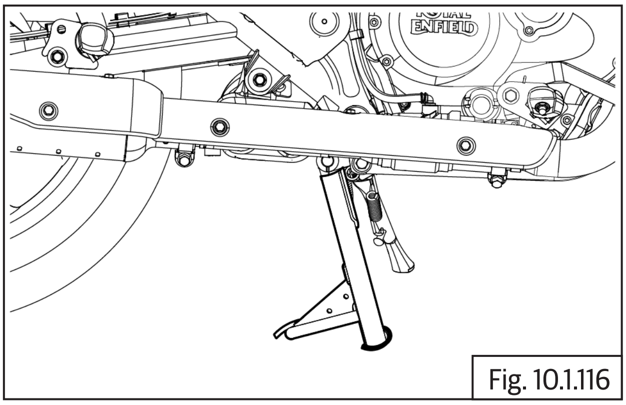


Fig. 10.1.116

- Ensure side stand is released.
- Locate switch on the slots provided over the side stand.

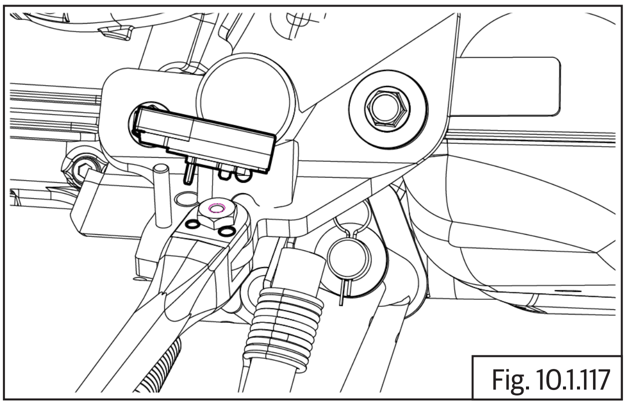


Fig. 10.1.117

- Locate and tighten Hex socket head cap screw **(M6) (a)** into side stand switch located on side stand **(b)**.

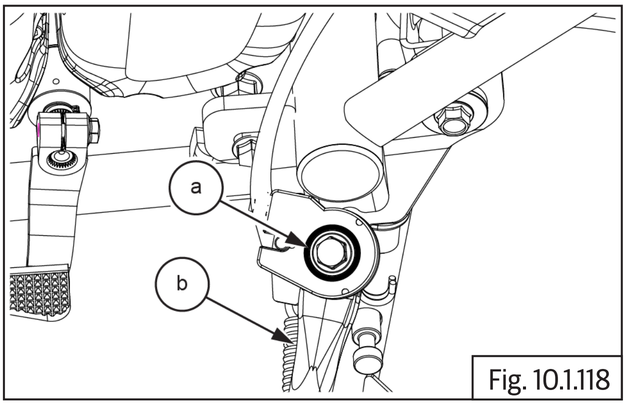


Fig. 10.1.118

🔧	12 mm Allen socket With Ratchet
Torque	8-10 N-m/0.8-1.0 kgf-m

- Connect side stand connector **(a)** into wiring harness connector located behind engine frame RH.
- Ensure connectors are locked properly and routed correctly.

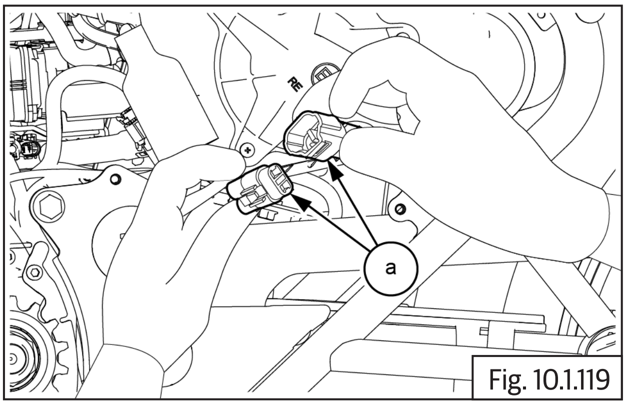


Fig. 10.1.119

10.1.39. Starter Motor Solenoid

- Locate solenoid connectors below battery tray Ensure ignition off.
- Gently slide and locate solenoid coil into battery tray bracket.

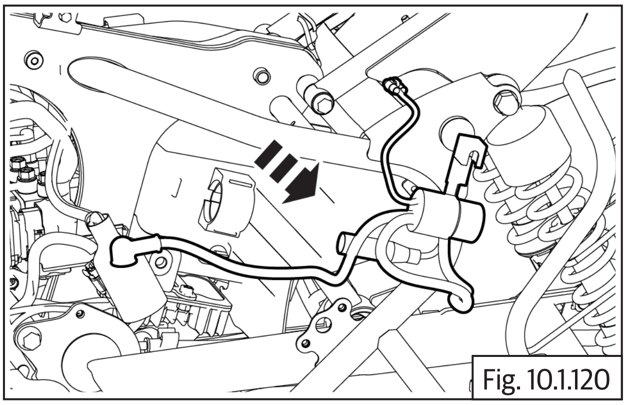


Fig. 10.1.120

- Connect starter solenoid connectors **(a)** into wiring harness.

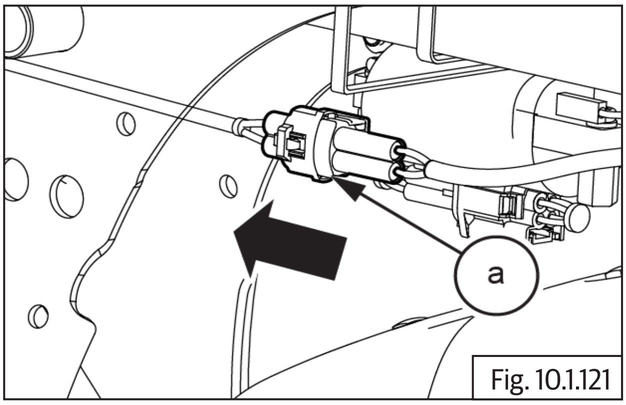


Fig. 10.1.121

- Assemble the following:
    - Rear mudguard in fill cover (section 6.6.10).
    - Wheel speed sensor front and rear (section 9.3.8).

10.1.39 Actuator

Actuator Tests

- The following actuators can be tested for their functionality using the diagnostic tool/ PC software.
    1. Fuel Pump
    2. Injector
    3. Ignition Coil
    4. O2 sensor heater
    5. Malfunction Indication Lamp (MIL)
    6. Idle Air Control Valve (IACV)
    7. Canister Purge Valve (CPV)
    8. Secondary Air Injection Solenoid (SAI)
    9. Accessory Relay

Test Procedure

- **Entry Conditions**
    1. Actuator tests can be carried out when the ignition key and kill switch are ON and engine speed is 0.
    2. For IACV alone, engine speed can be greater than 0.
    3. For actuation of injector and ignition coil, gear should be in neutral. If not in neutral, clutch lever should be pressed.
    4. Errors associated to the corresponding actuator, if present, will inhibit the actuation.
- **Procedure**

  A. In EOL software

    1. Connect the tool with the diagnostic coupler in the vehicle and connect it with PC using the USB cable.
    2. Select the option “EOL” & select Actuator.
    3. Select the required actuator and press.

  B. In NACSII tool

    1. Connect the tool with the diagnostic coupler in the vehicle

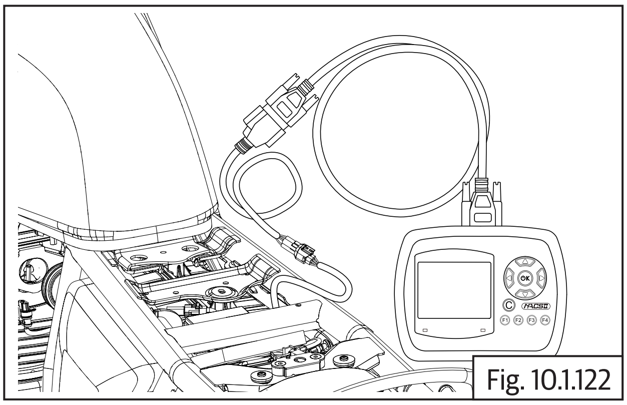


Fig. 10.1.122

    2. Select the vehicle model name and select Bosch Engine Management System
    3. Select the option Actuator
    4. Select the required actuator and press F3 to actuate

- **Method of verification**

4. For fuel pump, when actuated, an audible sound can be heard for 5 seconds .

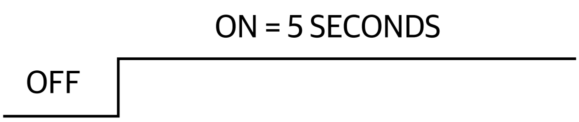


Fig. 10.1.123

5. Prior to actuation of injector, prime the fuel pump 3 times to build up sufficient pressure in fuel line. To ensure injectors are working properly, remove the throttle body from the intake manifold, connect all the injector couplers and actuate. When actuated, 3 pulses of fuel spray from the injector can be seen.

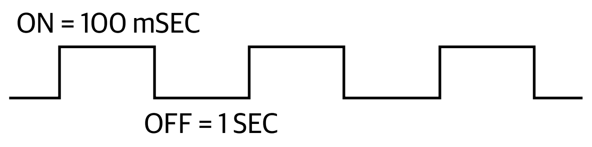


Fig. 10.1.124

6. Prior to the actuation of ignition coil, remove the suppressor cap and connect with an external spark plug and ground it to engine. Do not ground the ignition coil directly. When actuated, 3 sparks can be seen.

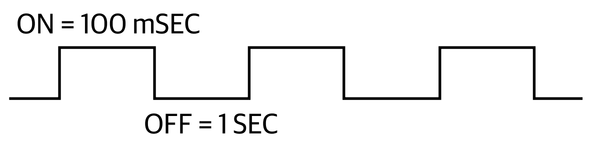


Fig. 10.1.125

7. To check O2 sensor heater, the sensor has to be removed from the exhaust pipe. When actuation is requested, the sensor will get heated up and this happens for 5 seconds.

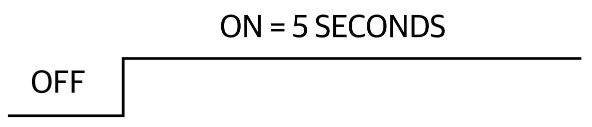


Fig. 10.1.126

8. When MIL is actuated, the bulb goes ON & OFF for 5 times.

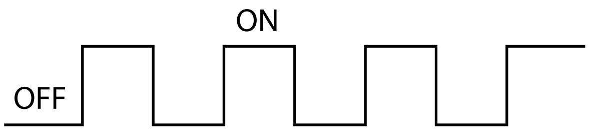


Fig. 10.1.127

9. Start and idle the engine before actuating IACV. If actuation command is given, one can observe the engine rpm rising up & falling down the target idle speed. Once actuation is completed, it settles back to target idle speed.

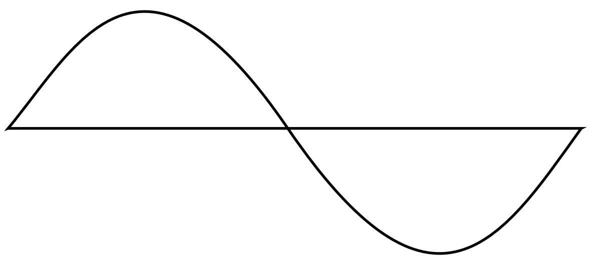


Fig. 10.1.128

10. When CPV is actuated, a pulsating sound can be observed. If not, the canister purge valve has to be manually touched to feel actuation.

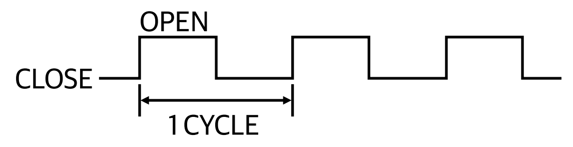

OPEN
CLOSE
1 CYCLE

Fig. 10.1.129

11. SAI solenoid will get actuated for 20 cycles

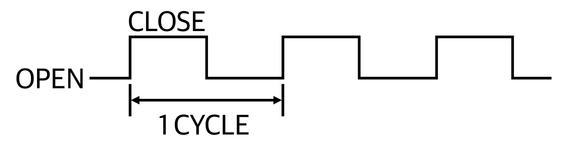

CLOSE
OPEN
1 CYCLE

Fig. 10.1.130

12. Accessory relay gets actuated for 5 cycles.

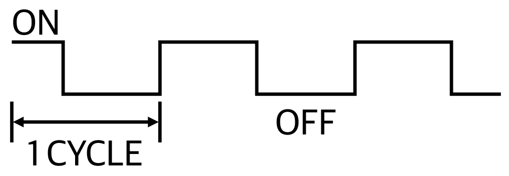

ON
OFF
1 CYCLE

Fig. 10.1.131

EMS DTC CODES

10.2 EMS DTC Codes

Sl. No.	P-Code	EMS Component	DTC Description
1	P0197	Engine Oil Temperature Sensor	EOT sensor circuit low
2	P0030	Lambda/O2 sensor	Lambds/O2 sensor heater control circuit low/open
3	P0261	Injector	Injector circuit low/open
4	P0562	Battery	Battery voltage low
5	P0627	Fuel Pump	Fuel Pump circuit low/open
6	P0412	Secondary Air Injection	SAV circuit low/open
7	P0444	Canister Purge Valve	Canister purge valve circuit low/open
8	P0198	Engine Oil Temperature Sensor	Engine Oil Temperature Sensor Low/open
9	P0298	Engine Oil Temperature Sensor	Engine Oil Temperature Sensor High
10	P0032	Lambda/O2 sensor	O_2 Sensor Heater Circuit High
11	P0131	Lambda/O2 sensor	O_2 Sensor Circuit Low
12	P0132	Lambda/O2 sensor	O_2 Sensor Circuit High
13	P0134	Lambda/O2 sensor	O_2 Sensor Circuit Open
14	P0171	Lambda/O2 sensor	Fuel system running too lean
15	P0172	Lambda/O2 sensor	Fuel system running too rich
16	P2191	Lambda/O2 sensor	O_2 Sensor Circuit/NPL/Bank 2 Sensor 1 LH
17	P0262	Injector	Injector Circuit High
18	P0563	Battery	Battery voltage high
19	P0335	Crank Sensor	Crank sensor error

Sl. No.	P-Code	EMS Component	DTC Description
20	P0336	Crank Sensor	Crank sensor synchronization lost
21	P0339	Crank Sensor	Crank sensor gap position incorrect
22	P0371	Crank Sensor	Crank sensor additional tooth detected
23	P0372	Crank Sensor	Crank sensor missing tooth detected
24	P0373	Crank Sensor	Crank sensor additional edges inside filtering period.
25	P0413	Secondary Air Valve	SAV circuit high
26	P0459	Canister Purge Valve	Purge valve solenoid circuit high
27	P0650	MIL	MIL circuit malfunction
28	P1638	Headlamp Control	Headlamp control circuit low/open
29	P1639	Headlamp Control	Headlamp control circuit high
30	P0219	Crank Sensor	Engine overspeed
31	P0629	Fuel Pump	Fuel pump circuit high
32	P2300	Ignition Coil	Ignition coil circuit low/open
33	P2301	Ignition Coil	Ignition coil circuit high
34	P0112	Intake Air Temperature (IBS)	Intake air temperature low
35	P0113	Intake Air Temperature (IBS)	Intake air temperature high
36	P0107	Manifold Absolute Pressure (IBS)	MAP Low
37	P0108	Manifold Absolute Pressure (IBS)	MAP High
38	P0121	Throttle Position Sensor (IBS)	TPS adaptation out of control
39	P0122	Throttle Position Sensor (IBS)	TPS circuit low/open

Sl. No.	P-Code	EMS Component	DTC Description
40	P0123	Throttle Position Sensor (IBS)	TPS circuit high
41	P0505	Idle Air Controller (IBS)	IAC malfunction
42	P0508	Idle Air Controller (IBS)	IAC low/open
43	P0509	Idle Air Controller (IBS)	IAC high
44	P1530	Roll Over Sensor (IBS)	Roll over sensor position wrong
45	P1531	Roll Over Sensor (IBS)	Roll over sensor signal stuck
46	P1532	Roll Over Sensor (IBS)	Roll over sensor signal wrong
47	P1533	Roll Over Sensor (IBS)	Roll over sensor serial peripheral interface wrong
48	P1535	Roll Over Sensor (IBS)	Roll over sensor index wrong
49	P1536	Roll Over Sensor (IBS)	Roll over sensor polarity wrong
50	P0500	Vehicle Speed Sensor	Vehicle speed sensor malfunction
51	P0501	Vehicle Speed Sensor	Vehicle speed sensor no signal
52	U0009	CAN	CAN malfunction
53	U0121	CAN	CAN diagnosis error
54	U0415	CAN	CAN diagnosis error

ELECTRICAL SYSTEM

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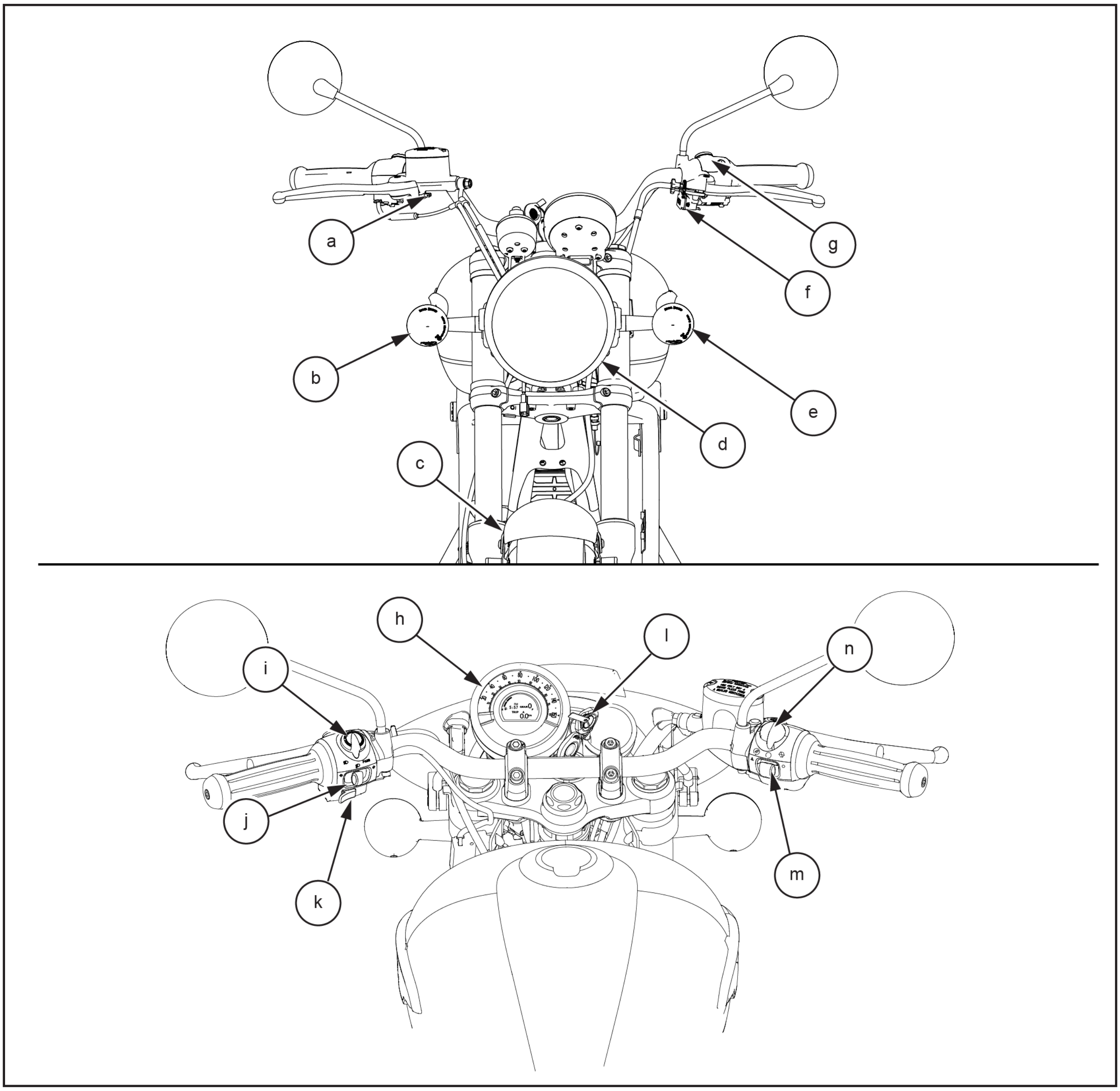
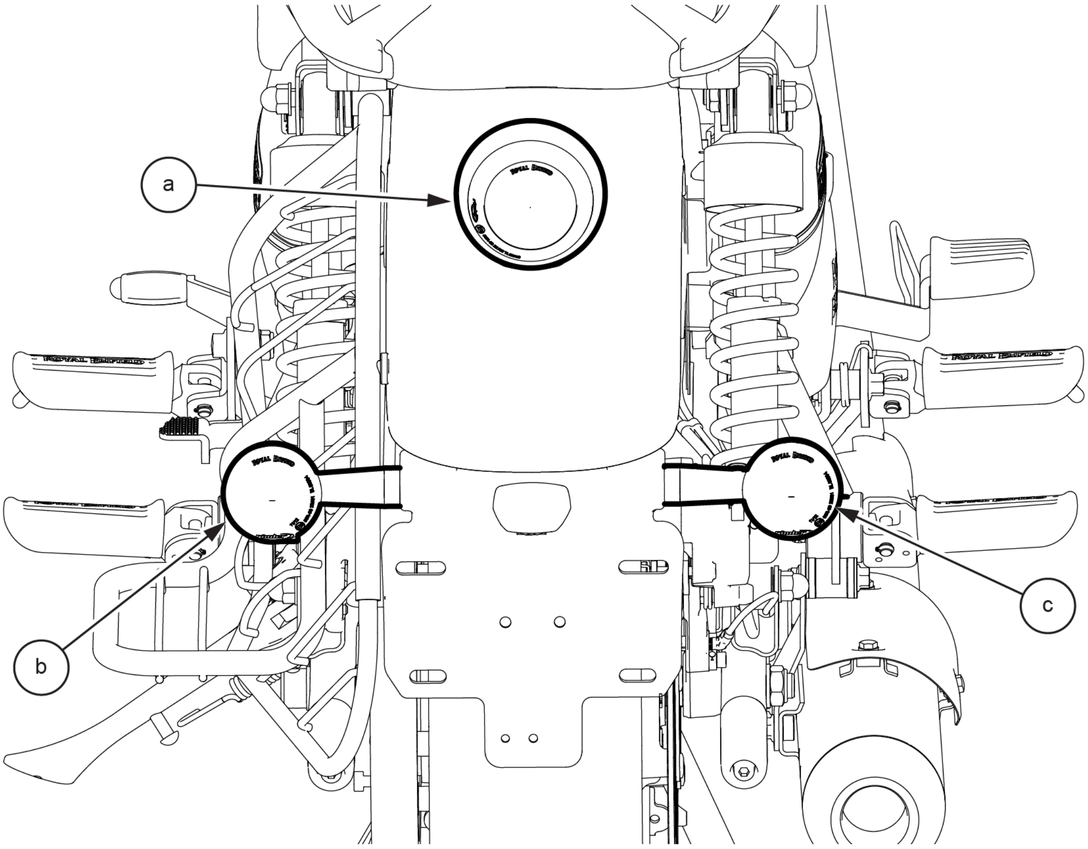
Electrical System Components - Front



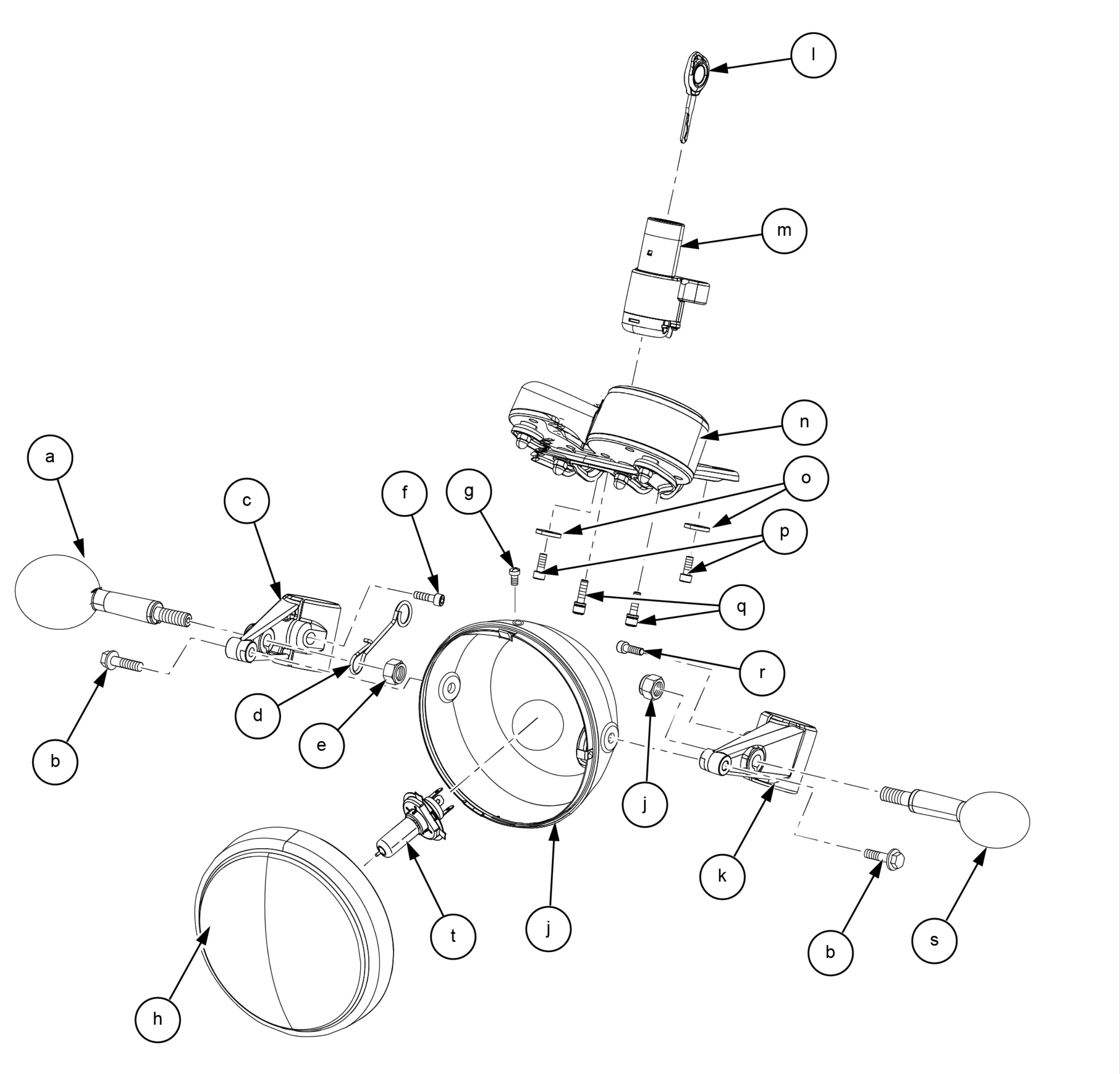
Item No.	Description	Quantity	Item No.	Description	Quantity
a	Front Brake Switch	1	h	Instrument Cluster	1
b	Trafficator Front RH	1	i	Highbeam/lowbeam/pass light	1
c	Horn	1	j	Trafficator toggle switch	1
d	Headlamp Assembly	1	k	Horn Button	1
e	Trafficator LH	1	l	Ignition Key Cylinder	1
f	Clutch Switch	1	m	Hazard switch	1
g	Information Button	1	n	Starter Switch	1

Electrical System Components - Rear



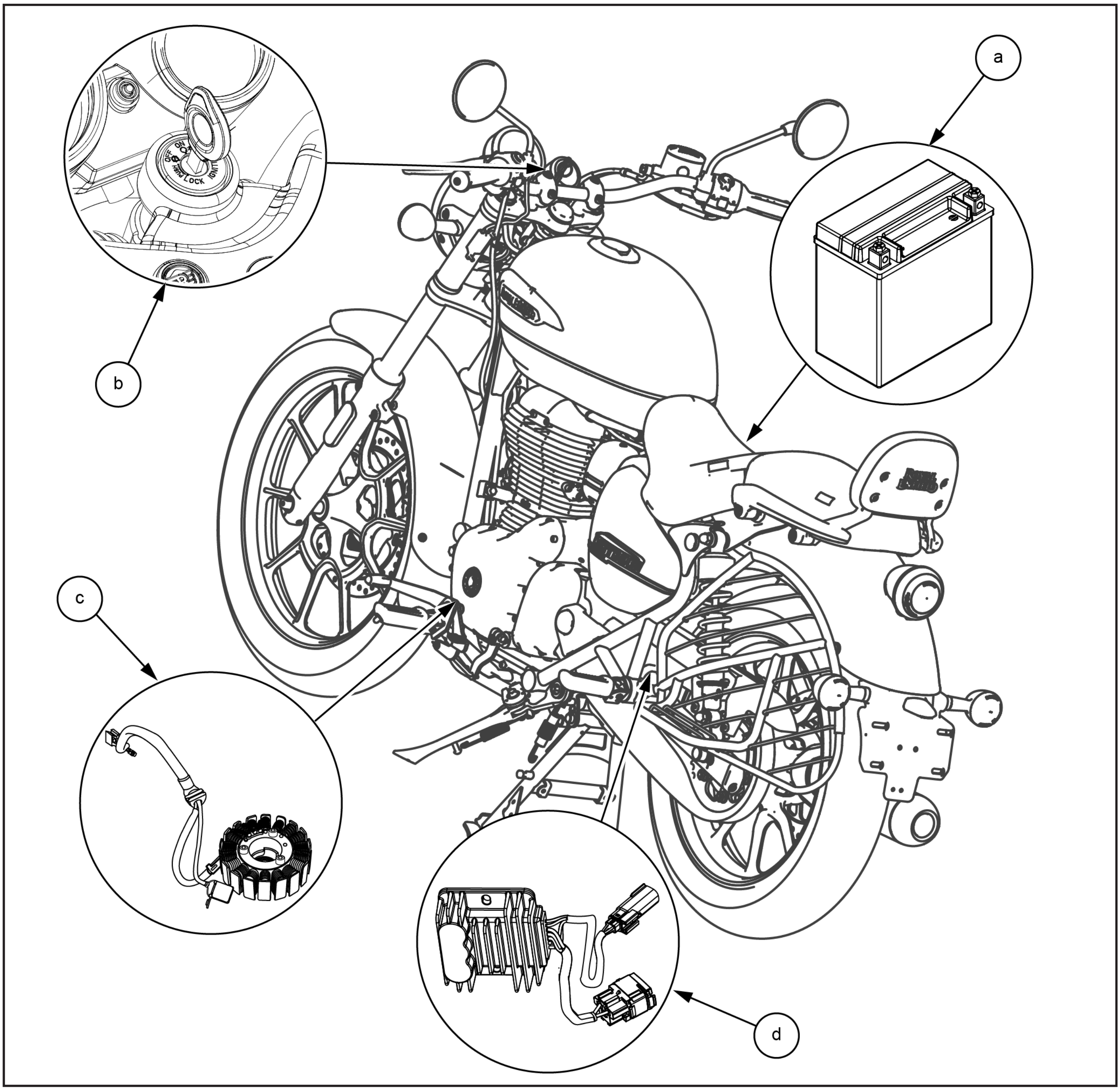
Item No.	Description	Quantity
a	LED taillamp	1
b	Trafficator rear LH	1
c	Trafficator rear RH	1

Headlamp and Cluster



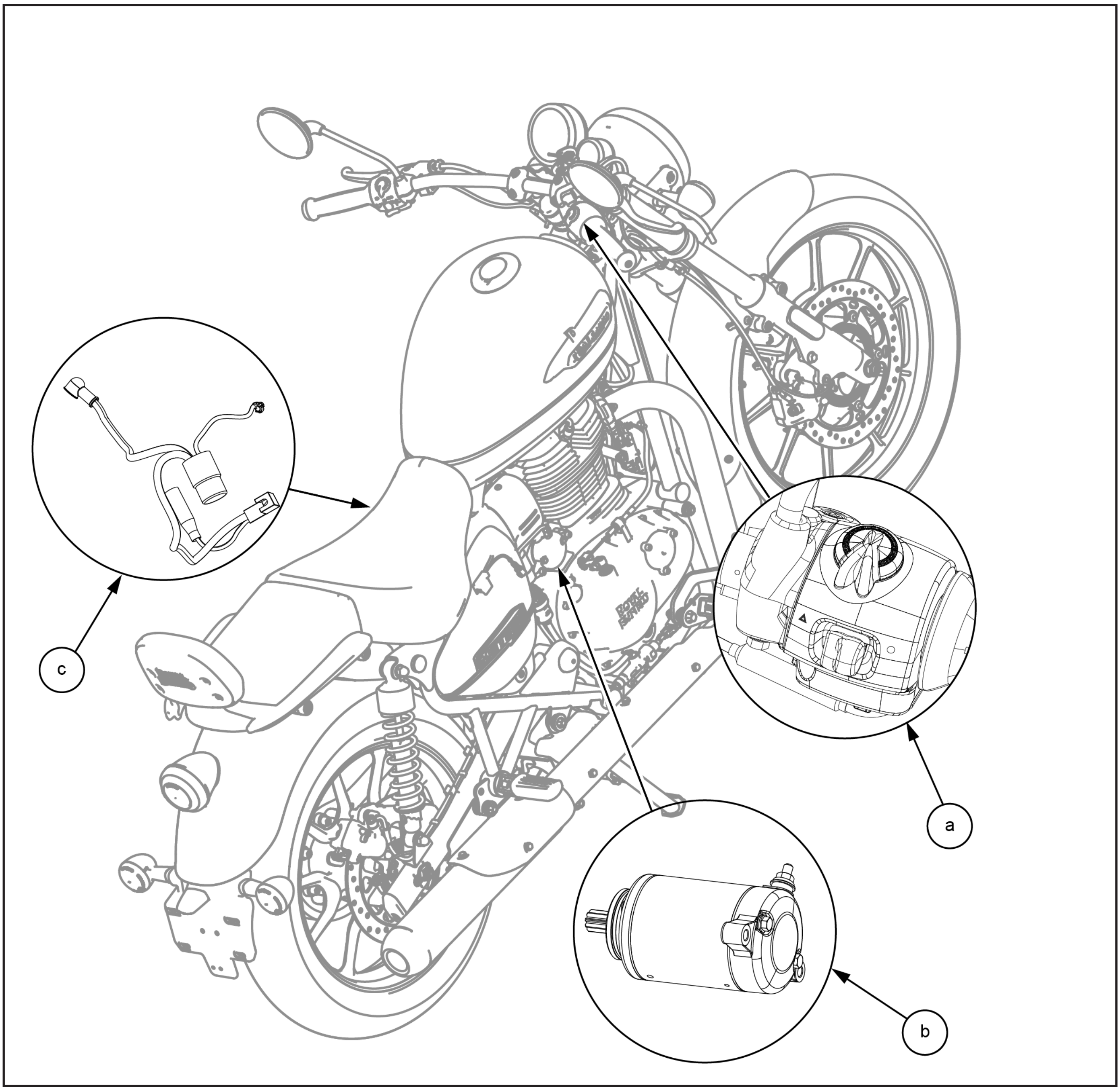
Item No.	Description	Quantity	Item No.	Description	Quantity
a	Trafficator Assembly with Bulb - Front RH	1	k	Headlamp Holder LH	1
b	Hex Flange Bolt M8 x 1.25 x 30 RH	2	l	Ignition Key	1
c	Headlamp Holder RH	1	m	Ignition Key Set	1
d	Wire Guide, Throttle Cable	1	n	Cluster	1
e	Hex Nut M12 x 1.25	1	o	Washer	2
f	Hex Socket HD. Cap Screw, M6 x 20 RH	1	p	Hex Socket Hd. Cap Screw, M6 x 20	2
g	Screw	1	q	Hex Socket Hd. Cap Screw, M6 x 20 RH	2
h	Headlamp Rim	1	r	Hex Flange Bolt M8 x 1.25 x 30 RH	1
i	Headlamp Housing	1	s	Trafficator Assembly With Bulb - Front LH	1
j	Headlamp cover	1	t	Headlamp Bulb (Halogen)	1

Charging System


a
b
c
d
OFF
LOCK
IGNITION

Item No.	Description	Quantity
a	Battery	1
b	Ignition Key	1
c	Stator Coil	1
d	Regulator and Rectifier Module	1

Charging System



Item No.	Description	Quantity
a	Kill Switch (Stop Button)	1
b	Starter Motor Assembly	1
c	Starter Solenoid	1

11. Electrical System

11.1 Headlamp and Cluster Dismantling

11.1.1 Headlamp Reflector from Housing

NOTE

- *Ensure ignition switch and stop switch in off condition*

⚠ CAUTION

Support the Headlamp assembly carefully.

- Loosen and remove 2 Nos. Phillips screws **(a)** on headlamp.

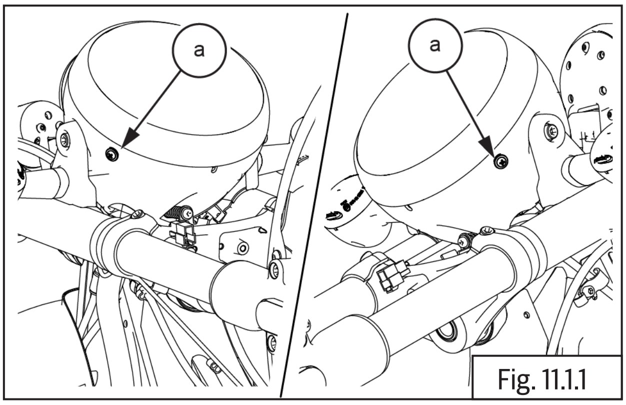


Fig. 11.1.1

	Phillips screw driver

- Gently remove front rim **(a)** along with reflector **(b)** from housing **(c)**.

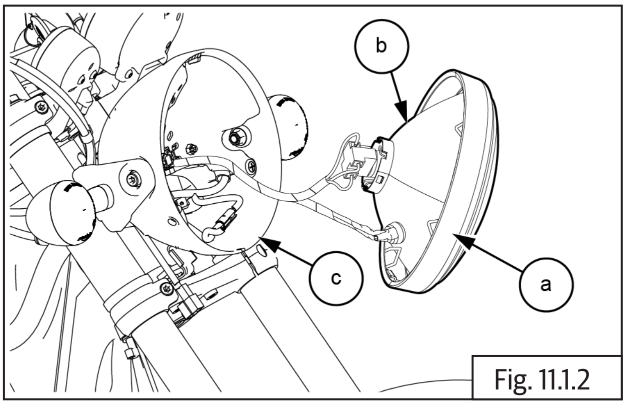


Fig. 11.1.2

⚠ WARNING

The headlamp and bulb can be extremely hot. Do not remove while headlamp/bulb are hot.

- Hold headlamp head carefully and disconnect headlamp connector **(a)** from headlamp bulb.

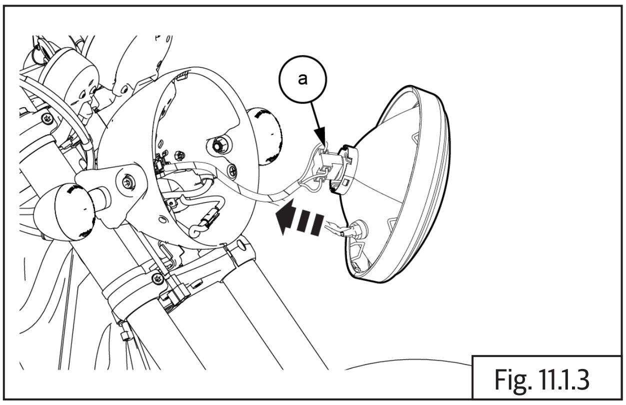


Fig. 11.1.3

- Remove rubber boot **(a)** from headlamp head.

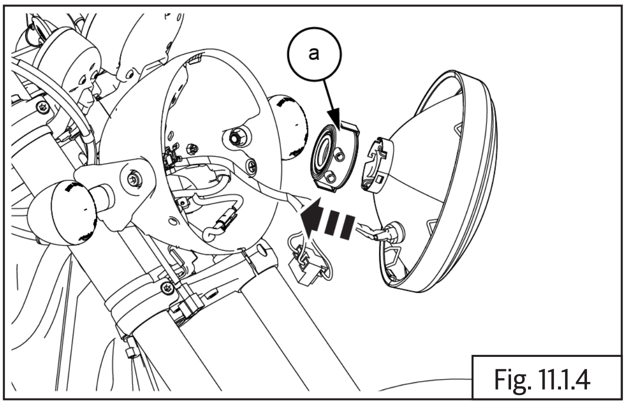


Fig. 11.1.4

- Disconnect Position lamp coupler **(a)** from headlamp head assembly.

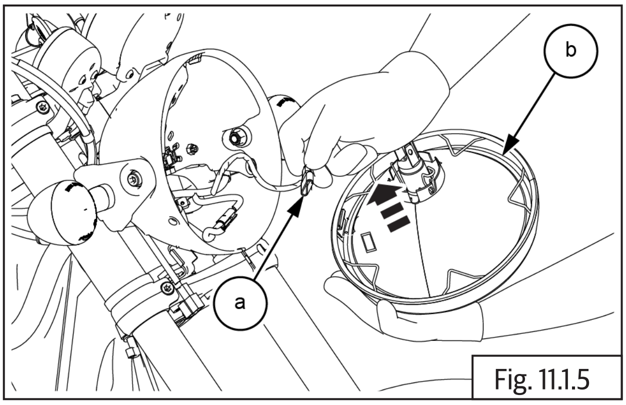


Fig. 11.1.5

11.1.3 Headlamp Bulb from Reflector

- Press wire clip **(a)** and release from slot **(b)** in headlamp reflector.

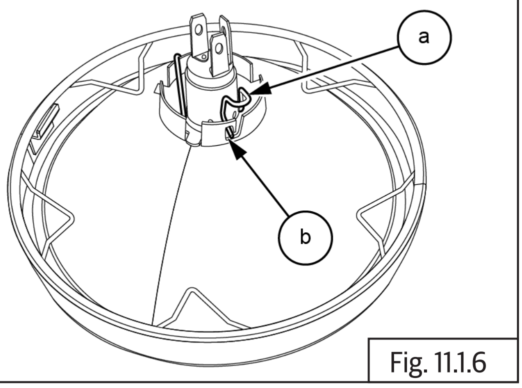


Fig. 11.1.6

- Remove wire clip **(a)** from reflector **(b)** and gently pull out headlamp bulb **(c)** from reflector.

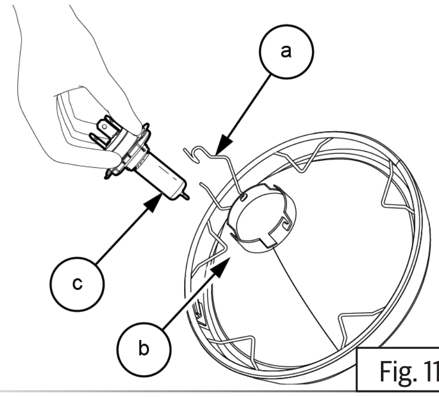


Fig. 11.1.7

⚠ CAUTION

Do not touch glass of bulb. Any strains or finger prints will affect the luminosity.

Ensure pointed tip of bulb does not get damaged

Whenever handling the bulb, hold it firmly at terminal end and not at glass end.

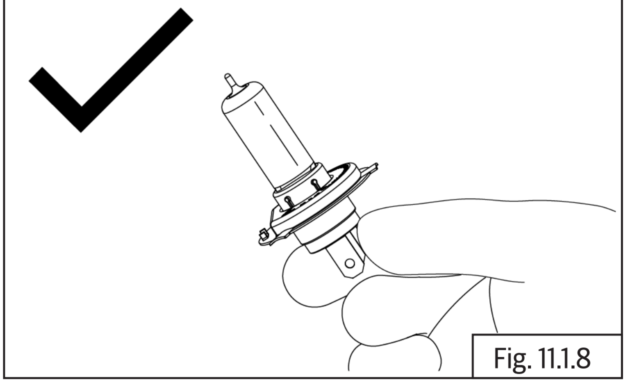


Fig. 11.1.8

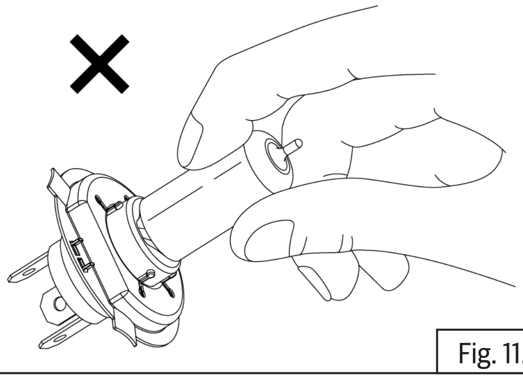


Fig. 11.1.9

11.1.4 Connectors and Sensors from Headlamp Housing

- Loosen and remove 2 Nos plastic screws **(a)** from wiring harness guide**(b)** ..

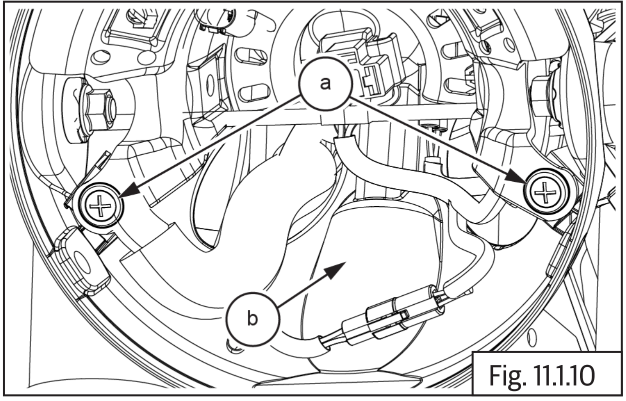


Fig. 11.1.10

Phillips screw driver

- Gently pull and remove the wiring harness guide.

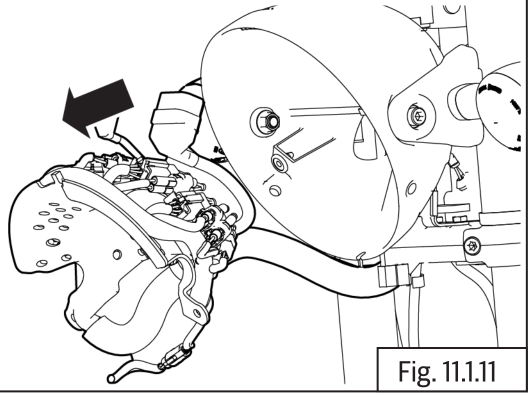


Fig. 11.1.11

- Disconnect LH module connector **(a)** from headlamp housing.

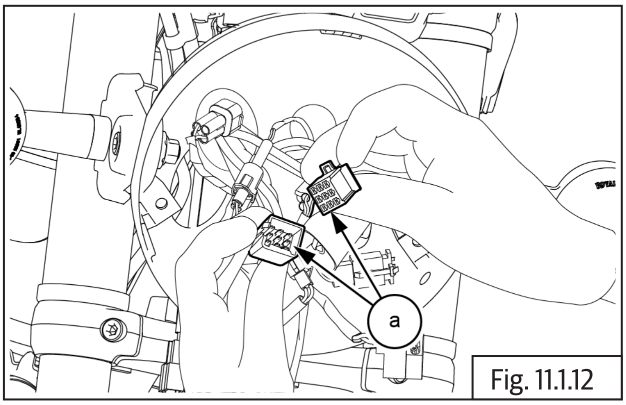


Fig. 11.1.12

- Disconnect clutch switch connector **(a)**.

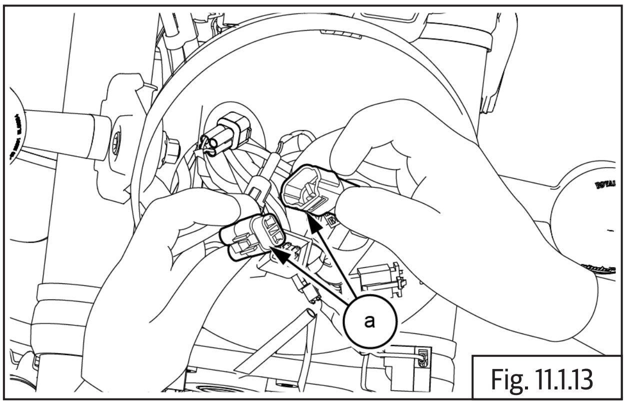


Fig. 11.1.13

- Disconnect front brake lamp switch connector **(a)**.

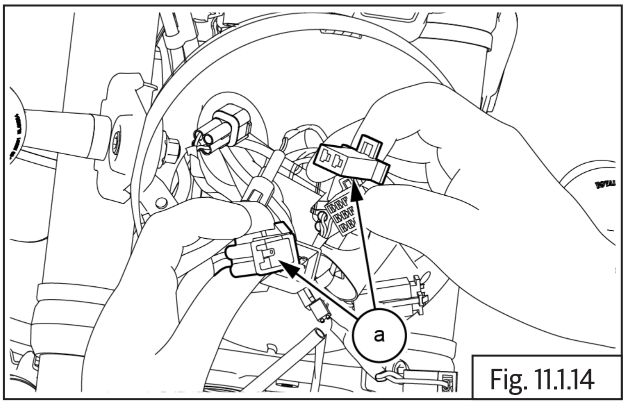


Fig. 11.1.14

- Disconnect RH module connector **(a)**.

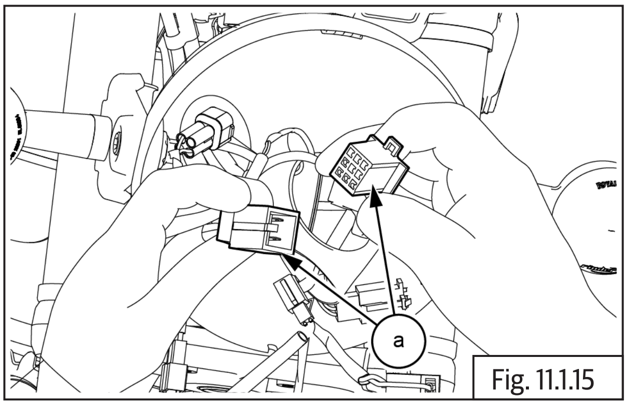


Fig. 11.1.15

- Disconnect wheel speed sensor connector **(a)**.

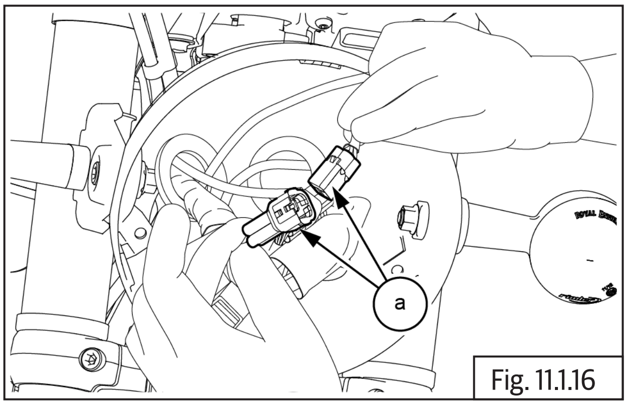


Fig. 11.1.16

- Press the lock to disconnect LH trafficator sensor connector **(a)**.

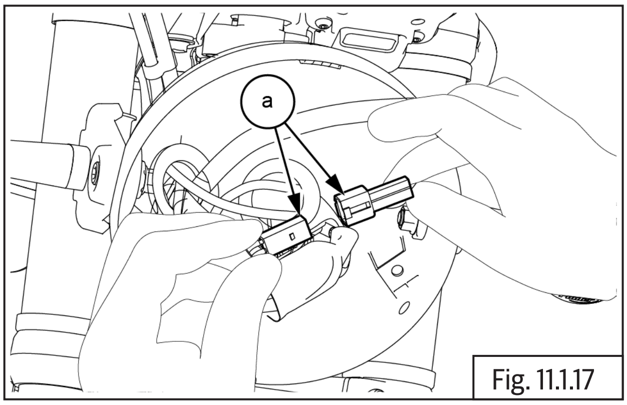


Fig. 11.1.17

- Disconnect RH trafficator sensor connector **(a)**.

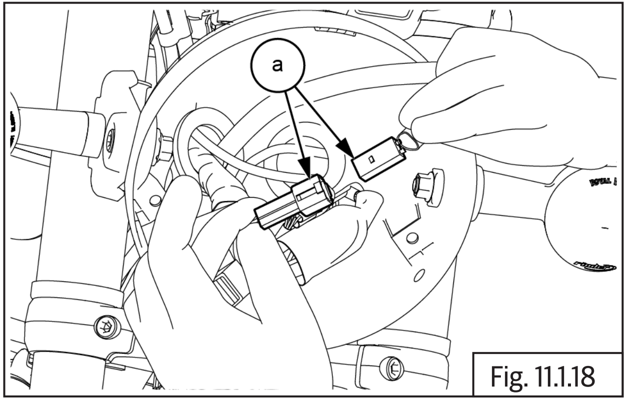


Fig. 11.1.18

- Disconnect ignition switch connector **(a)**.

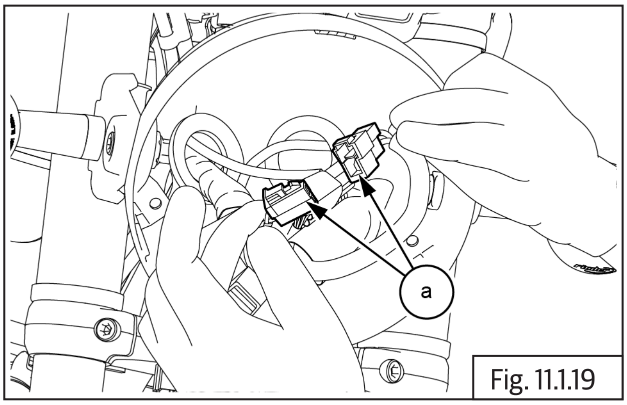


Fig. 11.1.19

11.1.5 Headlamp Housing from Holder LH & RH.

- Ensure all electrical connectors are removed.
- Support and loosen Hex flange holder bolts **(M8)** **(a)** RH and LH and remove headlamp housing.

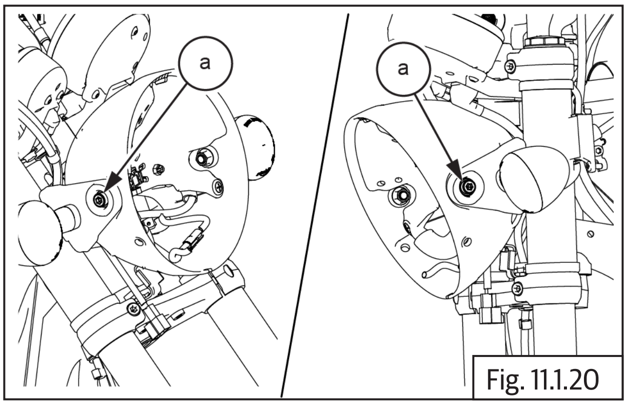


Fig. 11.1.20

	12 mm Socket with Ratchet

11.1.6 Direction Trafficators from Headlamp Holder

Dismantling

- Loosen and remove Hex nut **(M12)** **(a)** from LH direction trafficator.

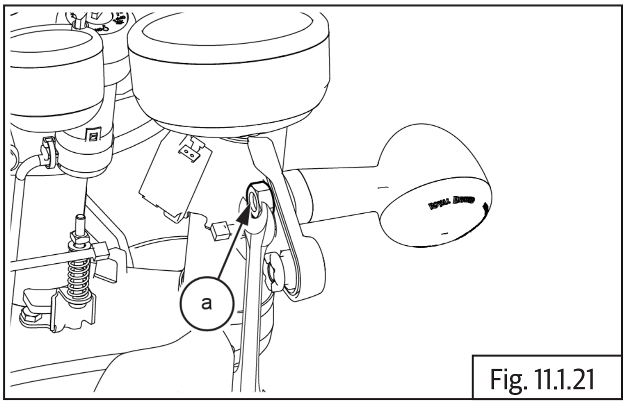


Fig. 11.1.21

	19 mm Ring spanner

- Remove LH direction trafficators **(a)** nut **(b) and** washer **(c)** from headlamp holder.

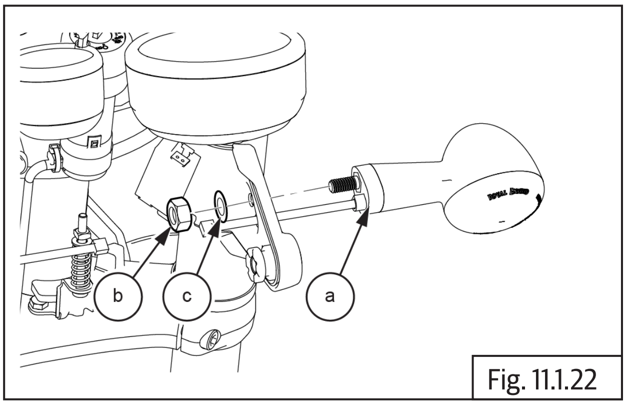


Fig. 11.1.22

- Similarly remove RH direction trafficator.

11.1.7 Cluster Dismantling

- Disconnect Instrument cluster coupler **(a)**.

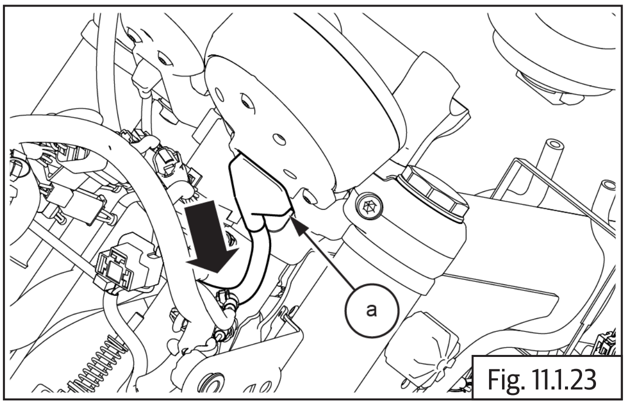


Fig. 11.1.23

- Disconnect TBT display coupler **(a)**.

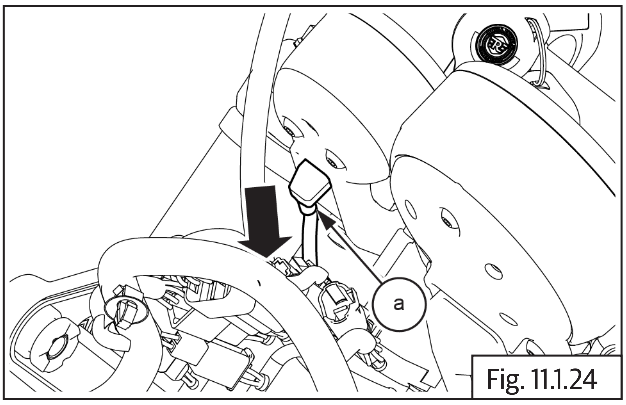


Fig. 11.1.24

- Remove 3 Nos. Hex socket head bolts **(a)** located below instrument cluster bracket.

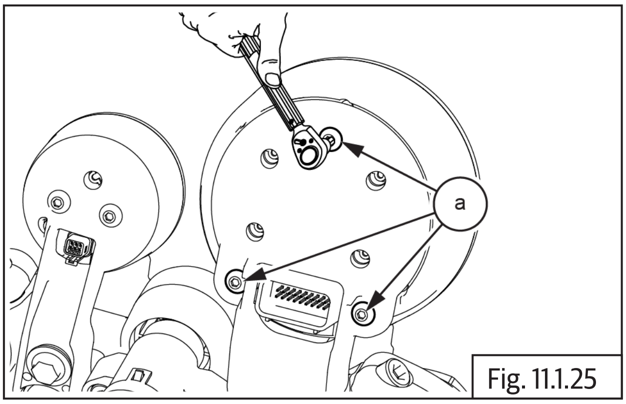


Fig. 11.1.25

🔧	3 mm Allen socket with Ratchet

- Remove instrument cluster **(a)**.

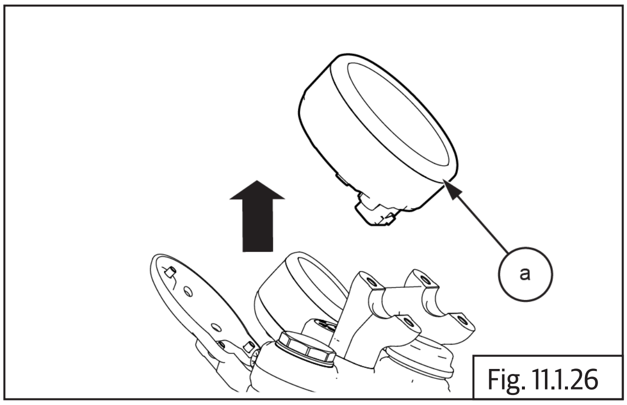


Fig. 11.1.26

- Remove 2 Nos. Hex socket head bolts **(a)** located below TBT cluster bracket.

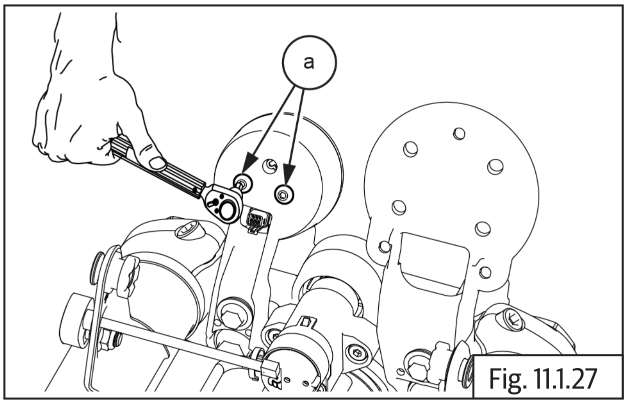


Fig. 11.1.27

🔧	3 mm Allen socket with Ratchet

- Remove TBT cluster **(a)**.

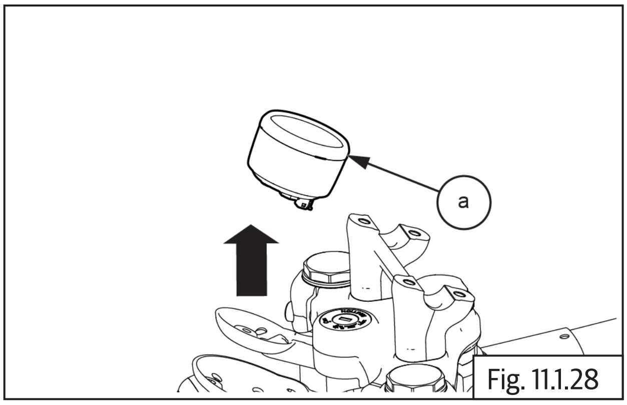


Fig. 11.1.28

- Remove 2 Nos. Hex socket head bolts **(M6) (a)** located below cluster bracket on LH and RH.

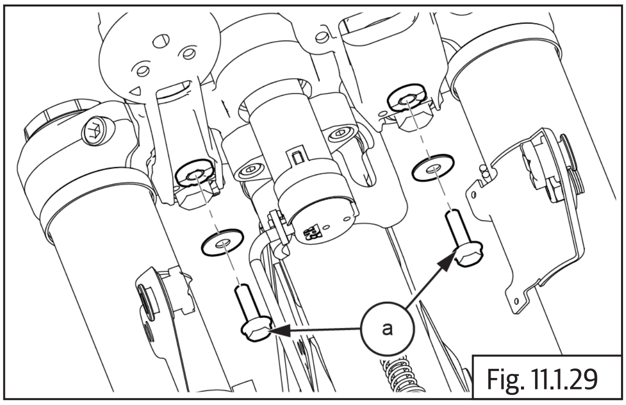


Fig. 11.1.29

10 mm socket with Ratchet

- Remove 2 Nos. Hex socket head bolts **(M10) (a)** located below cluster bracket on handlebar top yoke mounting LH and RH.

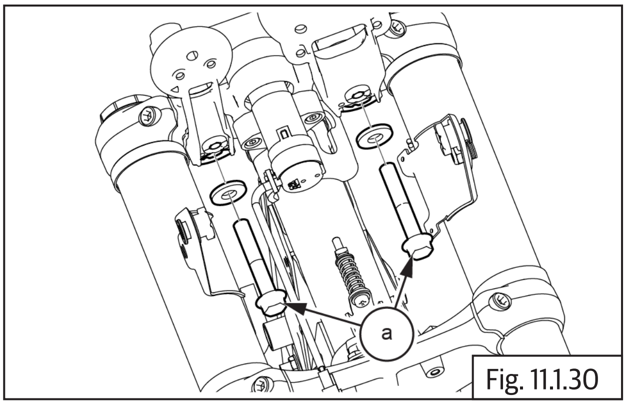


Fig. 11.1.30

14 mm socket with Ratchet

- Detach cluster bracket **(a)** from motorcycle and keep it aside safely.

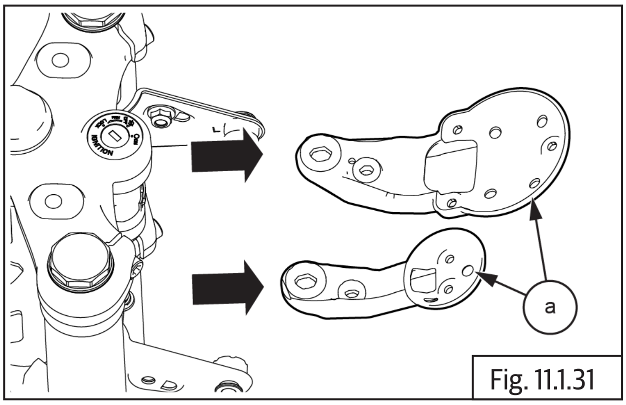


Fig. 11.1.31

11.1.7 Ignition Switch

- Remove 2 Nos. Hex socket head bolts **(M6) (a)** located below key set on LH and RH.

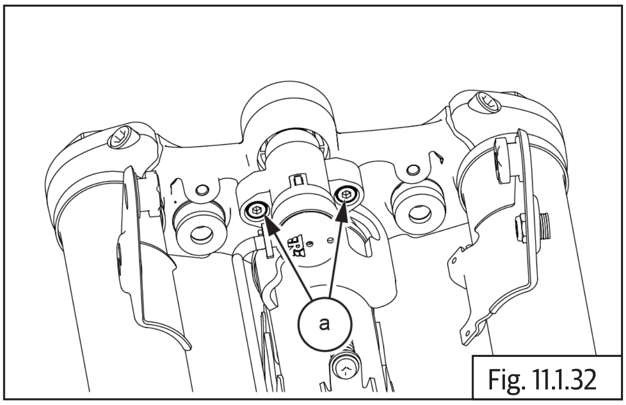


Fig. 11.1.32

5 mm Allen socket with Ratchet

- Gently remove ignition key set **(a)**.

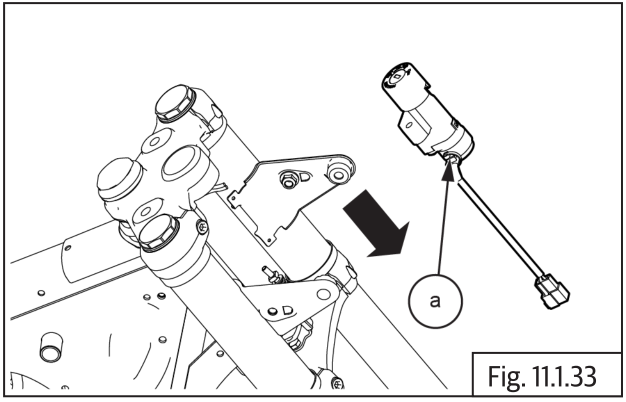


Fig. 11.1.33

11.1.8 Headlamp Housing Holders from Fork Legs

- Remove the steering top nut protective boot **(a)** from top yoke.

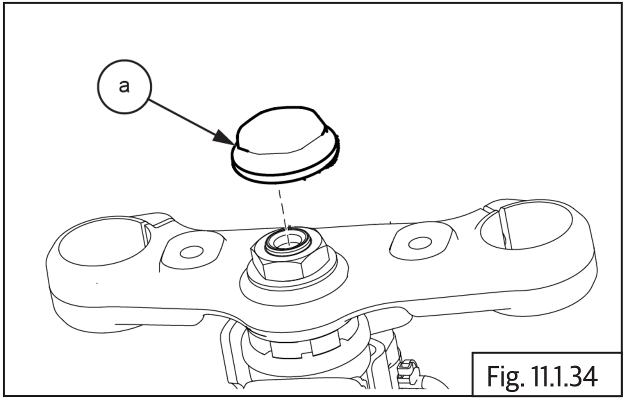


Fig. 11.1.34

	Screw Driver

- Loosen and remove top yoke nut **(a)** along with washer **(b)**.

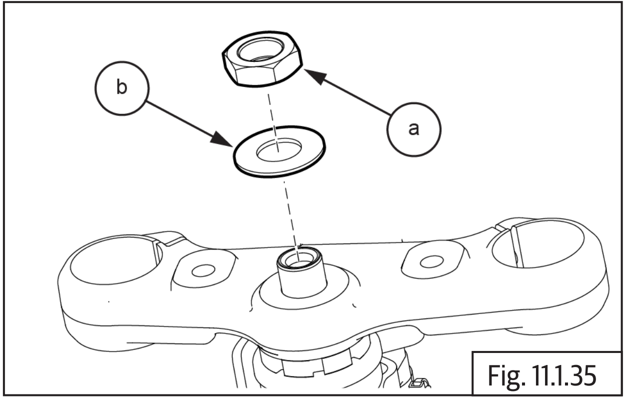


Fig. 11.1.35

	27 mm Hex Socket with Ratchet

- Ensure free movement of top yoke in steering stem and gently pull out top yoke **(a)** from steering stem.

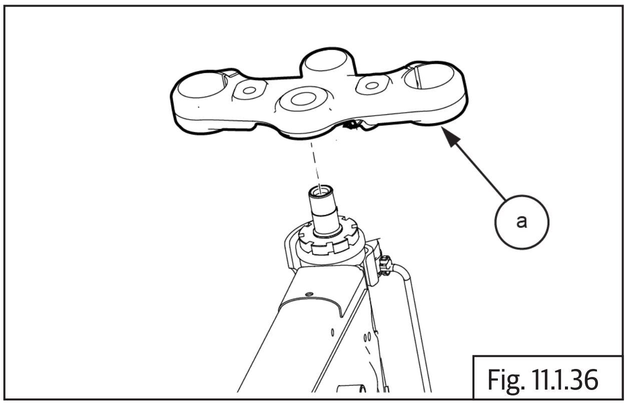


Fig. 11.1.36

- Pull out headlamp housing holders **(a)** LH & RH from front fork legs LH & RH **(b)** along with sub parts.

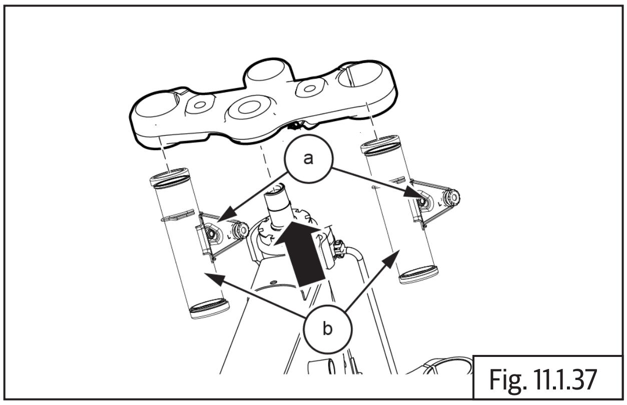


Fig. 11.1.37

11.2 Tail Lamp Dismantling

11.2.1 Tail Lamp

NOTE

- *Tail lamp is a sealed LED unit and is not serviceable. Hence it has to be replaced as a whole assembly if found malfunctioning.*

11.3 Brake Lamp Connectors Dismantling

11.3.1 Brake Lamp Connector - Rear

- Remove RH side panel (section 6.7.1).
- Rear brake lamp switch is connected in ABS modulator. Refer ABS section for dismantling procedure.

11.3.2 Brake Lamp Connector - Front

- Remove the following parts:
  - Headlamp assembly (section 11.1.1).
  - Front brake lamp switch (section 11.1.4).
- Disconnect front brake lamp connector **(a)**.

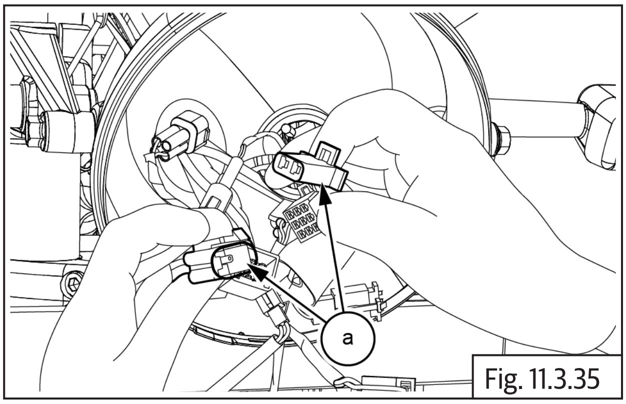


Fig. 11.3.35

11.4 Trafficators Dismantling

11.4.1 Direction Trafficators - Rear

- Remove rear number plate bracket (section 6.6.4).
- Support and remove tail lamp housing **(a)** from the frame **(b)**.

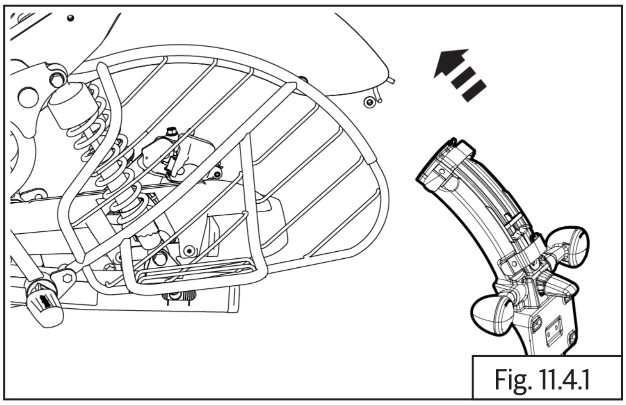


Fig. 11.4.1

- Loosen and remove hex nut **(M12)** **(a)** along with washer **(b)** to remove rear trafficator **(c)**.

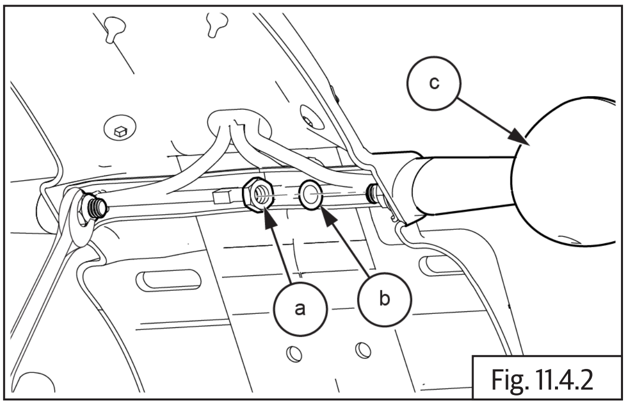


Fig. 11.4.2

19 mm Ring spanner

11.4.2 Trafficator bulb - Front

- Loosen and remove screw **(a)** along with washer **(b)** from front trafficator lens RH.

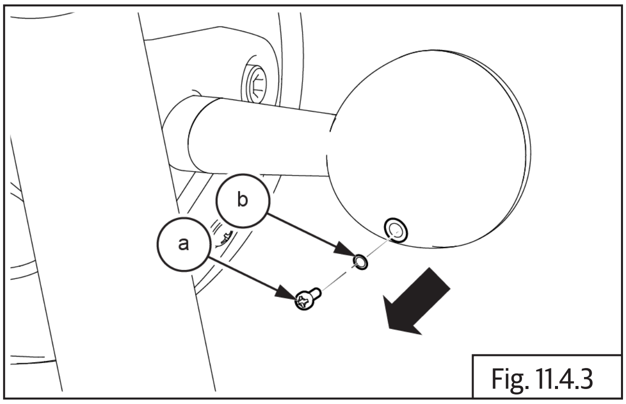


Fig. 11.4.3

Screw driver

- Remove lens **(a)** along with bulb assembly.

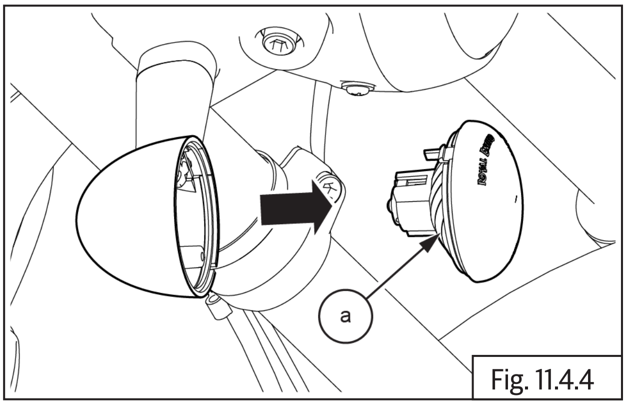


Fig. 11.4.4

- Remove grommet **(a)** from lens assembly **(b)**.

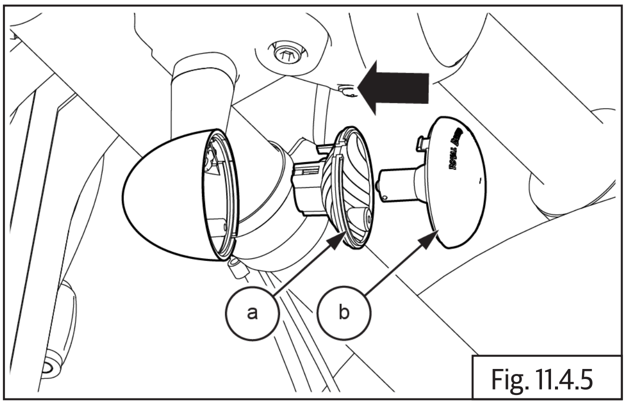


Fig. 11.4.5

- Remove bulb **(a)** from holder **(b)**.

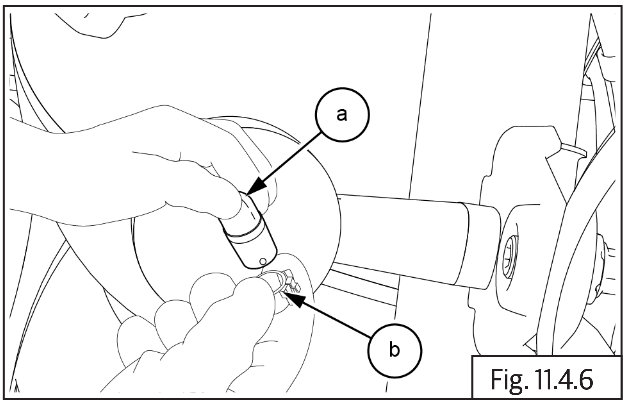


Fig. 11.4.6

- To remove the trafficator assembly from headlamp assembly refer (section 11.1.6).

11.5 Battery Dismantling

11.5.1 Battery Terminals

- Remove the following parts:
  - Side panel RH (section 6.7.1).
  - Rider seat (section 6.7.2).
  - Side panel LH (section 6.7.4).
- Ensure Ignition and stop switch are in OFF position before disconnecting battery cables.
- Refer general information (section 1.5.8) for battery connection and disconnection procedure.

NOTE

- *If battery lead is difficult to disconnect due to rust or corrosion of battery terminals, pour recommended battery terminal cleaning solution on terminals and then try to disconnect.*

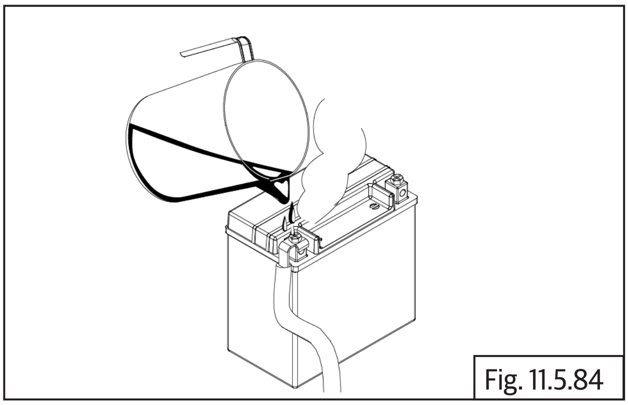


Fig. 11.5.84

- Loosen and remove 2 Nos. Hex head bolts **(M6)** **(a)** from battery support bracket**(b)**.

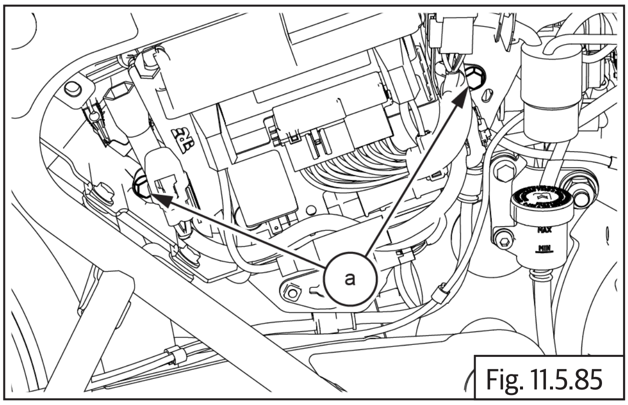


Fig. 11.5.85

🔧	10 mm Socket and Ratchet

- Remove battery support bracket along with fuse box and wiring.

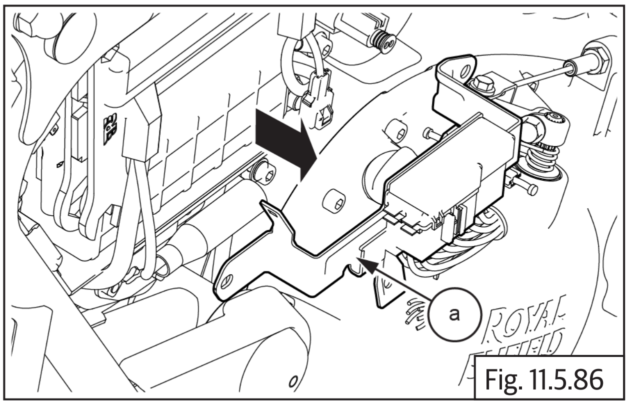


Fig. 11.5.86

- Disconnect battery negative (-) terminal bolt **(a)**.

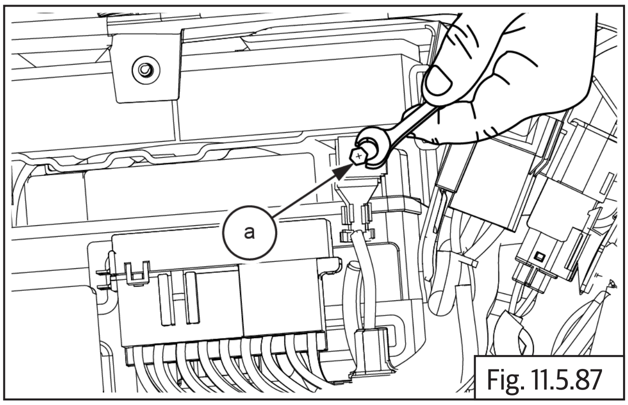


Fig. 11.5.87

🔧	10 mm Double end spanner

- Disconnect battery positive (+) terminal **(a)** from battery **(b)**.

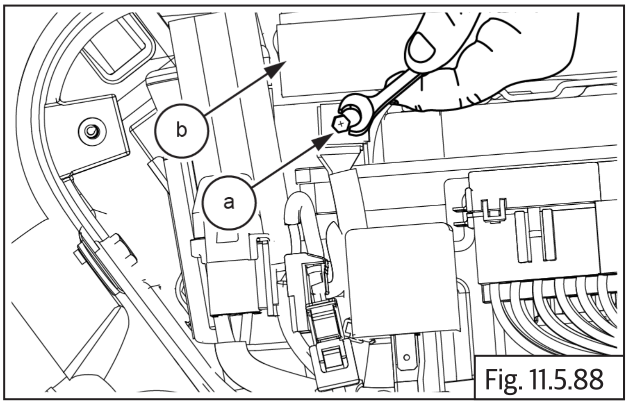


Fig. 11.5.88

🔧	10 mm Double end spanner

- Remove battery **(a)** from tray,

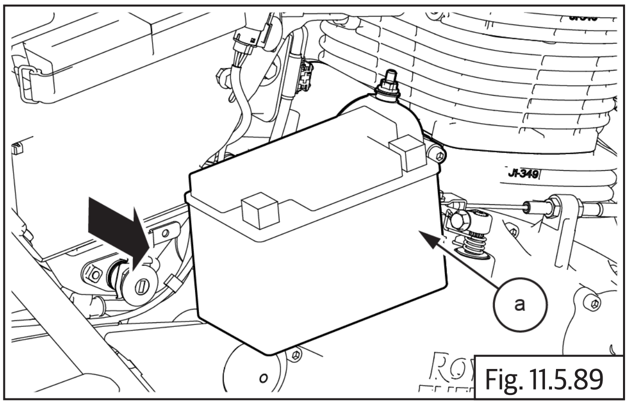


Fig. 11.5.89

Utility Box

- Remove the following parts:
  - Side panel RH (section 6.7.1).
- Loosen and remove 2 Nos. Hex head bolts **(M6) (a)** from tool holder **(b)**.

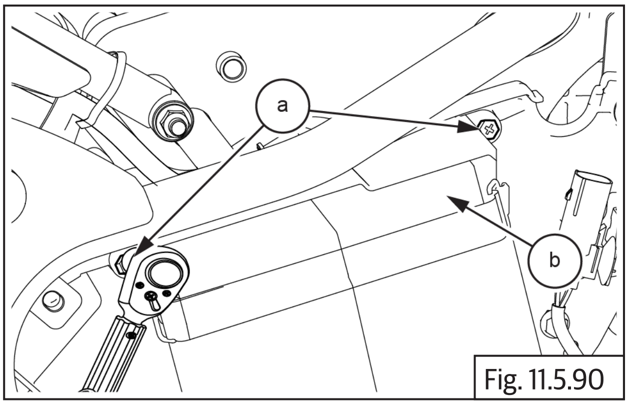


Fig. 11.5.90

🔧	10 mm Socket and Ratchet

- Gently pull the utility box tray **(a)** to remove..

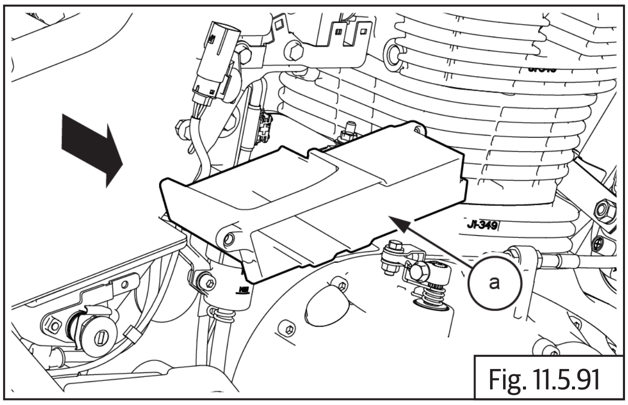


Fig. 11.5.91

11.5.2 Battery Tray

- Remove the following parts:
  - Rear wheel (section 6.8.3).
  - Starter solenoid from battery tray (section 11.5.3).
- Loosen and remove the 6 Nos. Hex head collar bolt **(M6) (a)** from frame RH.

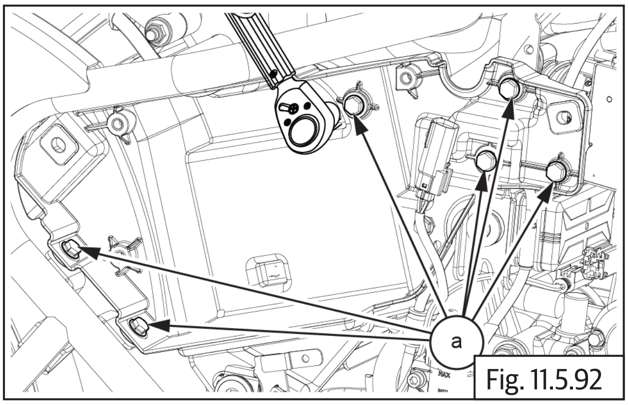


Fig. 11.5.92

🔧	10 mm Socket and Ratchet

- Ensure wiring harness routing is separated from battery bracket and remove battery tray **(a)** from frame.

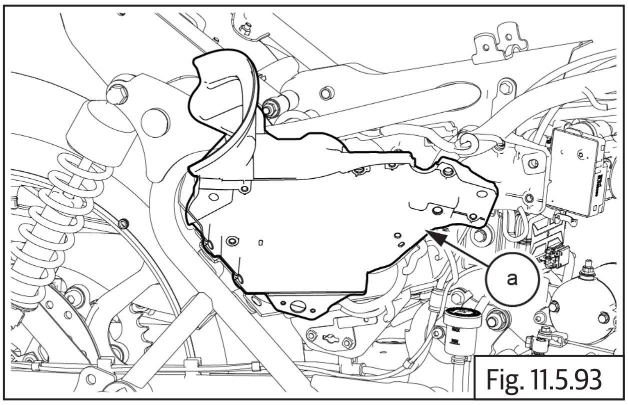


Fig. 11.5.93

- Gently pull battery tray from the rear to remove,

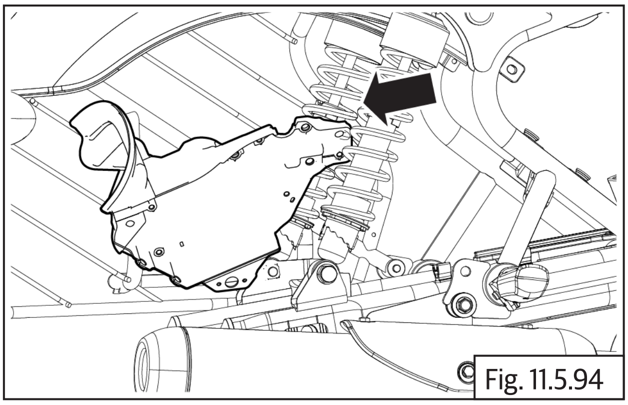


Fig. 11.5.94

11.5.3 Starter Solenoid

- Remove the following parts:
  - Remove rear wheel (section 6.8.3).
  - Remove rear mudguard in fill cover (section 6.6.7).
  - Remove battery positive (+) terminal (section 11.5.1).
- Disconnect starter solenoid connectors **(a)**. Solenoid connectors are located above battery tray.

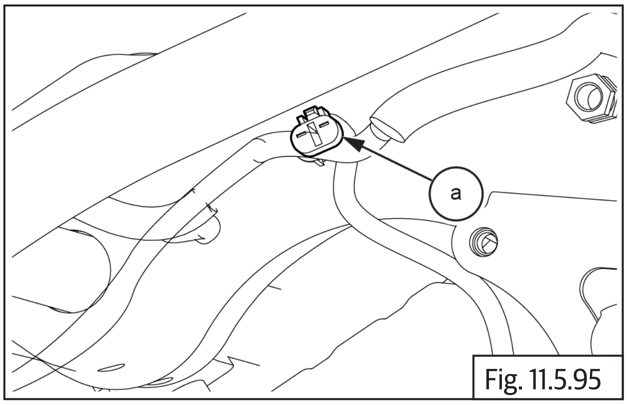


Fig. 11.5.95

- Gently slide out solenoid coil from battery bracket along with battery positive (+)cable.

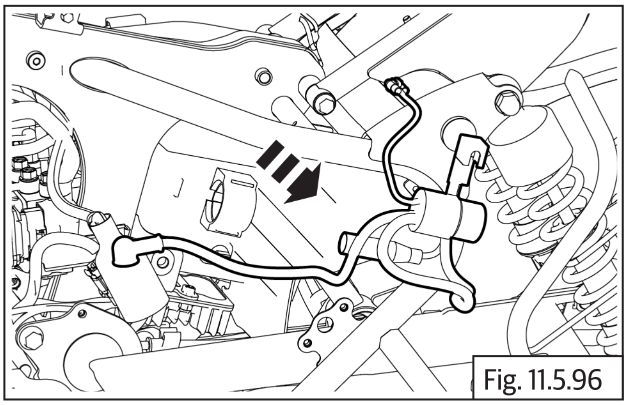


Fig. 11.5.96

11.5.4 RR Unit

⚠ CAUTION

Ensure motorcycle is placed on a flat surface, resting it on center stand/ramp.

Support motorcycle with suitable equipment below cradle frame. If necessary.

- Locate RR unit **(a)** behind engine guide below battery tray **(b)**.

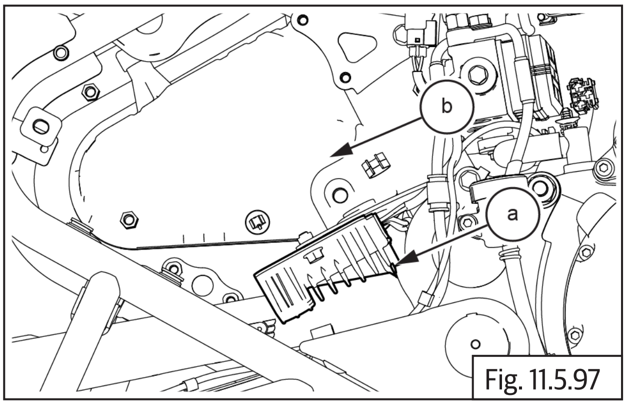


Fig. 11.5.97

- Disconnect RR unit connectors **(a)** and stator coil connectors **(b)** from magneto.

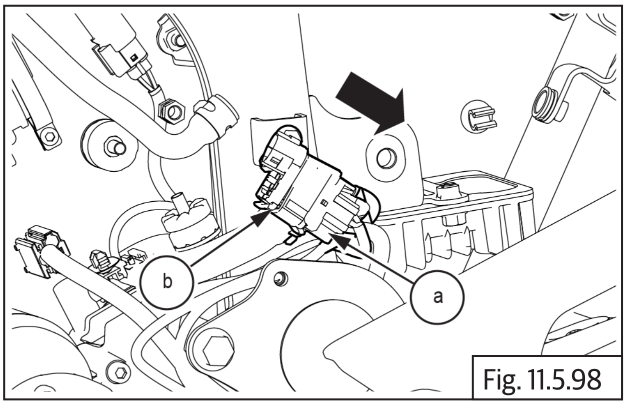


Fig. 11.5.98

- Loosen and remove 2 Nos. Hex flanged bolts **(M6)** **(a)** along with washer to remove RR unit.

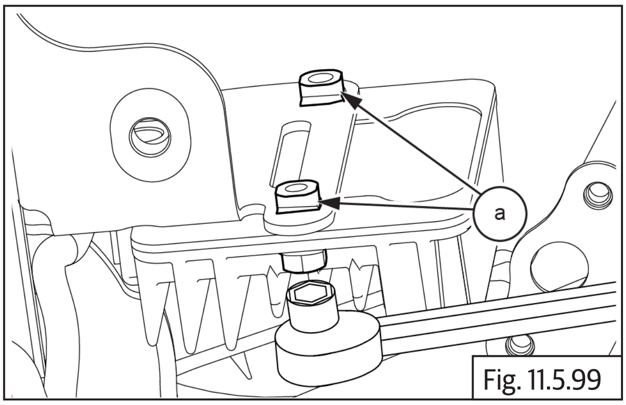


Fig. 11.5.99

🔧	10 mm Socket with Ratchet

- Gently slide down RR unit **(a)** from frame.

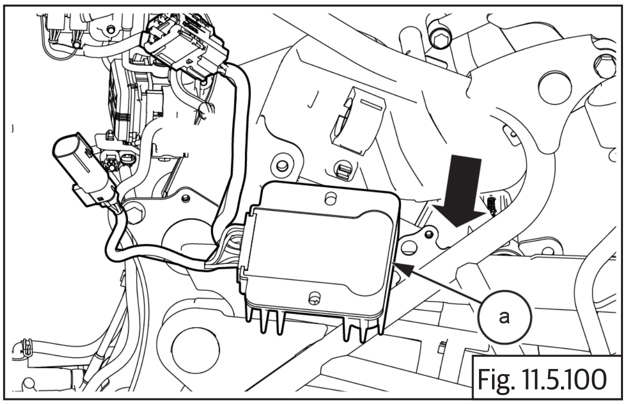


Fig. 11.5.100

11.6 Horn Dismantling

- Disconnect the horn connectors **(a).**

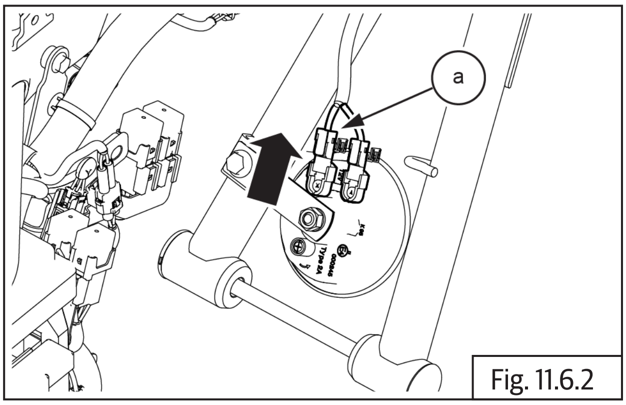


Fig. 11.6.2

- Loosen and remove Hex flange bolt and nut **(M8) (a)** to remove horn bracket.

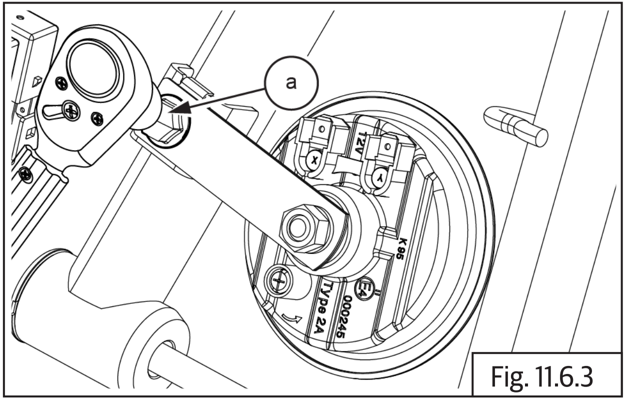


Fig. 11.6.3

🔧	12 mm Socket with Ratchet

Inspection

- Inspect connector pins for any bends, corrosions and damages.
- Inspect headlamp holder for any scratches, rust, cracks and damages. Replace if it is defective.
- Inspect and replace reflector if it has any damages and/or distraction.
- Inspect if wire clips are loosened and tighten appropriately.
- Inspect if headlamp holder bolt is loosened and tighten appropriately.
- Inspect the bulb filament **(a)** for any damages and replace.

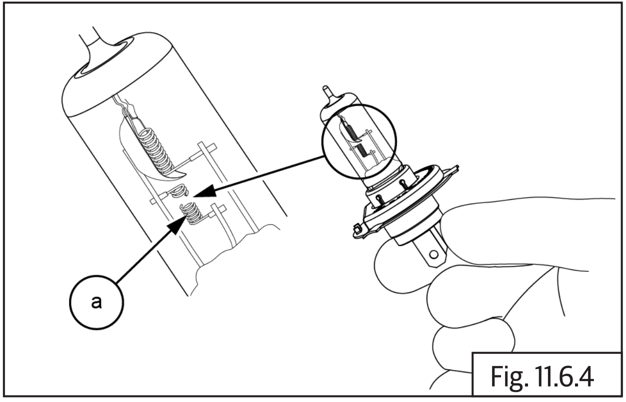


Fig. 11.6.4

Battery

- Check battery for any damages.
- Check the battery terminals for sulfating, corrosion or damages.
- Test voltage level. It should be 12.4V to 12.8V approximately.

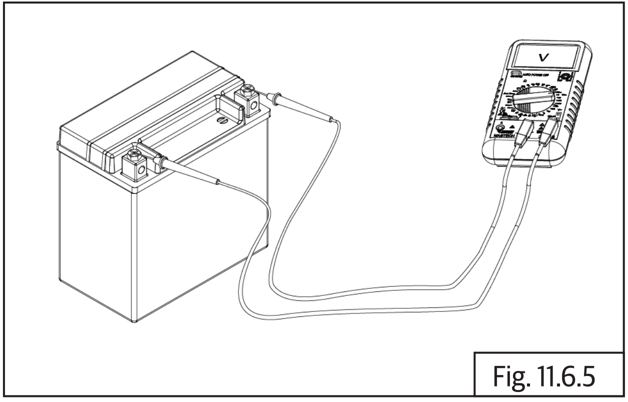


Fig. 11.6.5

Assembly

11.7 Horn Assembly

- Locate and tighten Hex flange bolt and nut **(M8) (a)** into horn bracket.

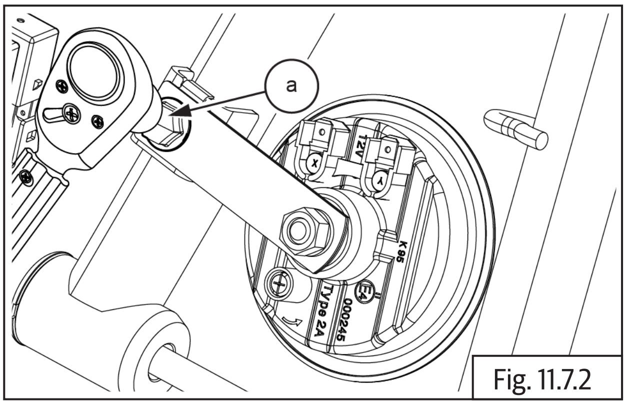


Fig. 11.7.2

	12 mm Socket with Ratchet
Torque	25 N-m/2.5 kgf-m

- Connect horn connectors **(a)**.

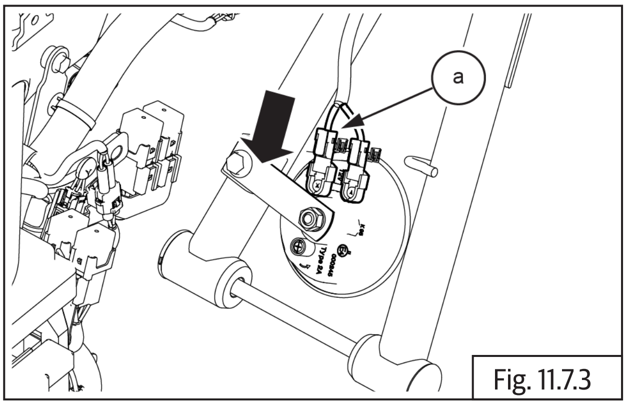


Fig. 11.7.3

11.8 Battery Assembly

11.8.1 RR Unit

- Locate RR unit **(a)** into frame to fix RR unit.

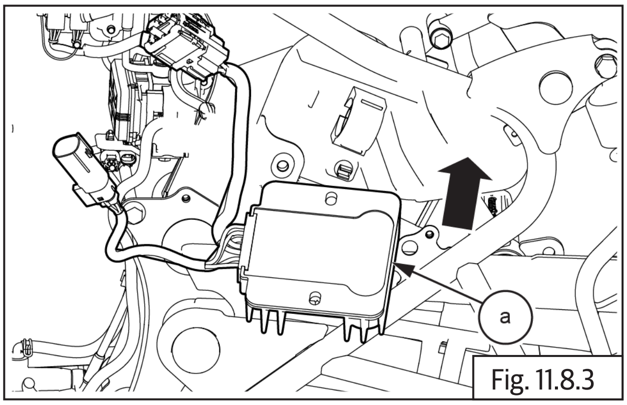


Fig. 11.8.3

- Insert and tighten 2 Nos. Hex flanged bolts **(M6) (a)** along with washer to fix RR unit.

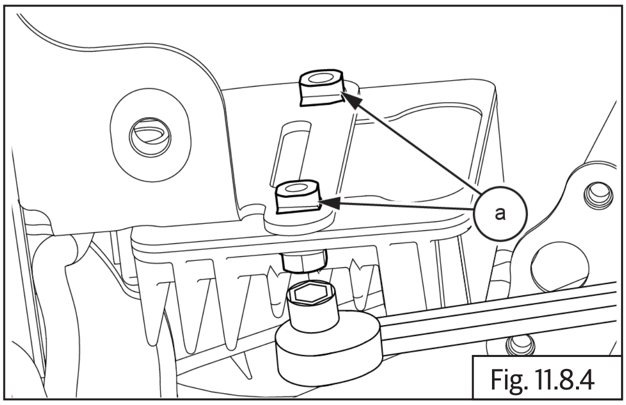


Fig. 11.8.4

	10 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Connect RR unit connectors **(a)** and **(b)** into wiring harness and ensure they are locked properly.

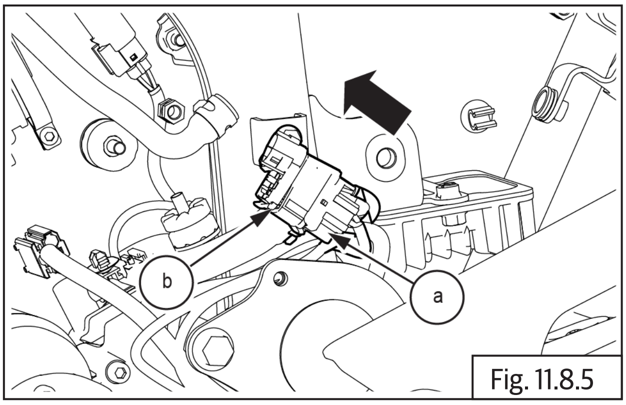


Fig. 11.8.5

11.8.2 Starter Solenoid

- Gently slide and locate solenoid coil into battery bracket.

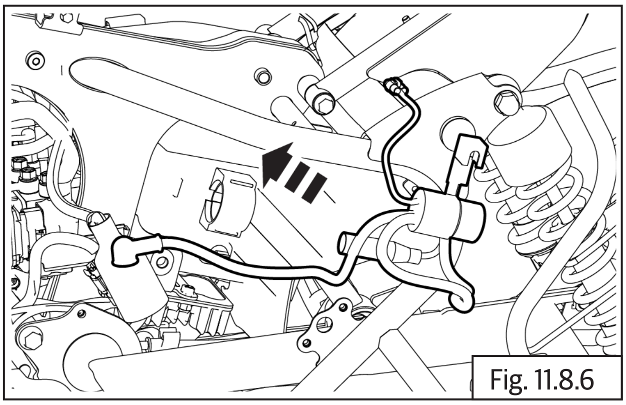


Fig. 11.8.6

- Connect starter solenoid connectors **(a)** into wiring harness.

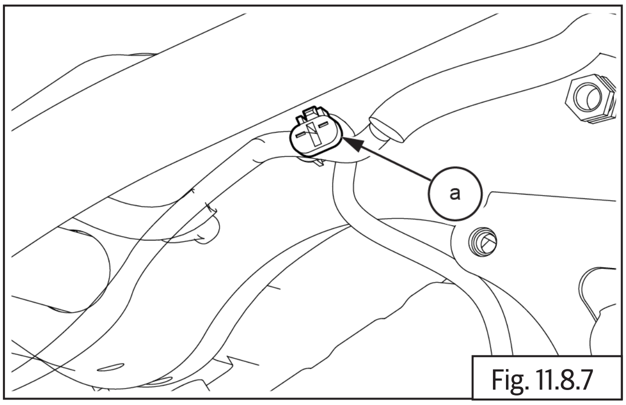


Fig. 11.8.7

11.8.3 Battery Tray

- Locate battery tray **(a)** into frame and ensure wiring harness routing is done into battery bracket.

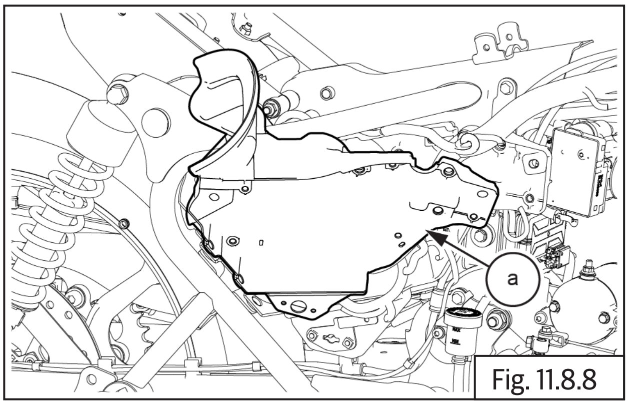


Fig. 11.8.8

- Locate and tighten 6 Nos. Hex head collar bolt **(M6)** **(a)** into frame.

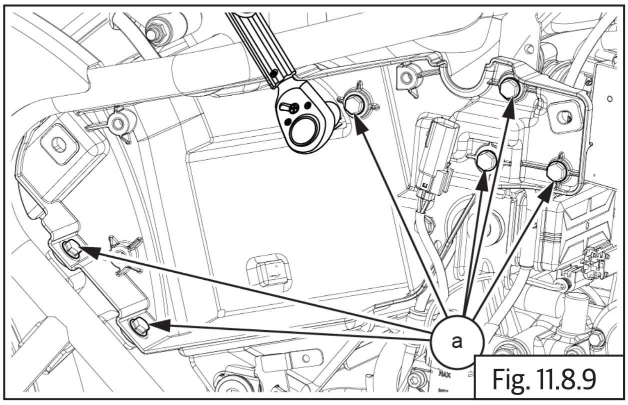


Fig. 11.8.9

🔧	10 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Locate and insert utility tray into battery tray.**(a)**.

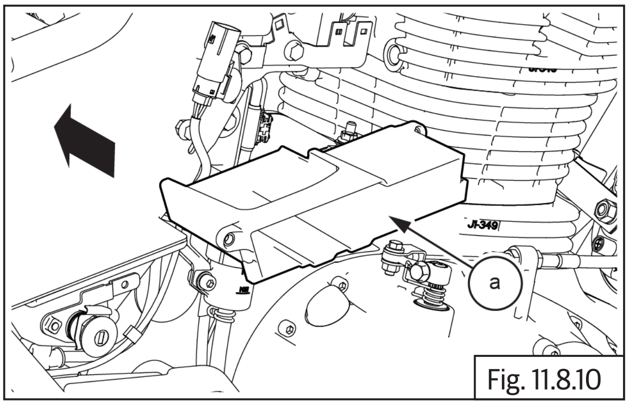


Fig. 11.8.10

- Locate and tighten 2 Nos Hex flange bolts **(M6) (a)** on utility box **(b)**.

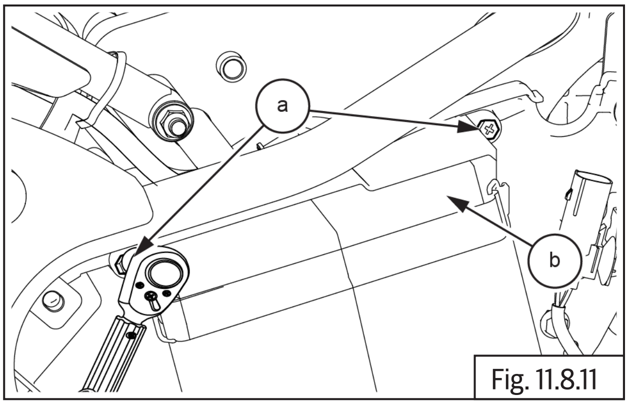


Fig. 11.8.11

🔧	10 mm Socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Install battery **(a)** into tray **(b)**.

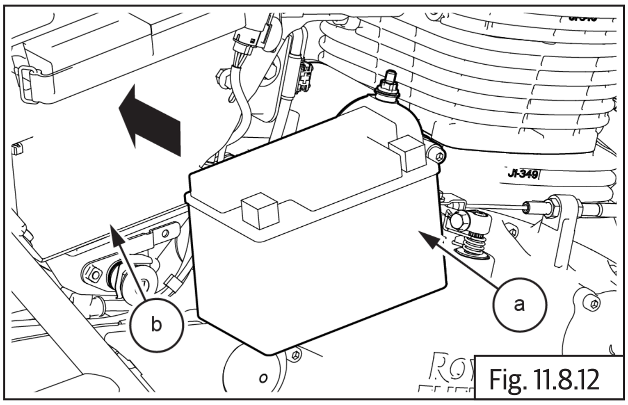


Fig. 11.8.12

- Place battery support bracket **(a)** onto battery tray **(b)**.

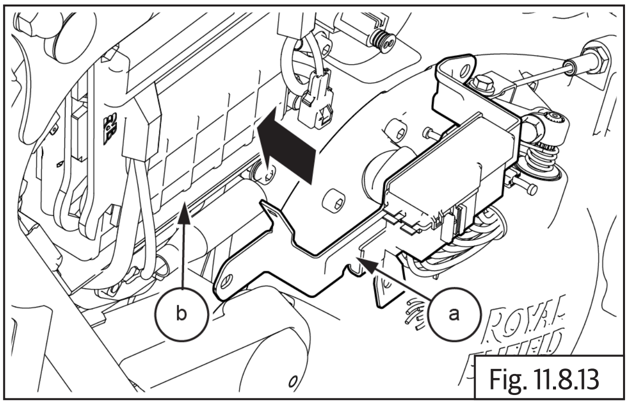


Fig. 11.8.13

- Locate and tighten 2 Nos flanged head screw **(M6) (a)** onto battery strap bracket **(b)**.

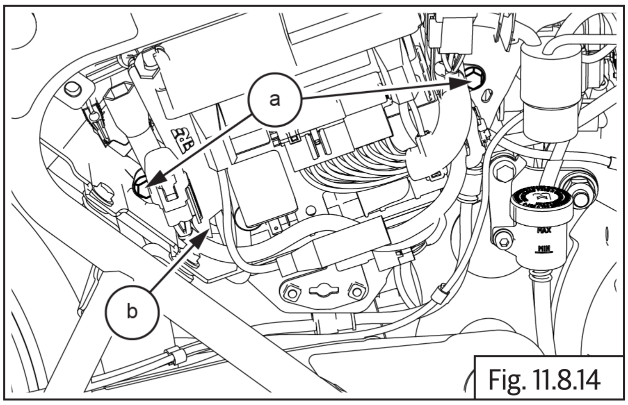


Fig. 11.8.14

🔧	5 mm Allen key with Ratchet
Torque	10 N-m/1.01 kgf-m

11.8.4 Battery Terminals

- Connect battery positive (+) terminal **(a)** and tighten Hex head bolt **(M6)**.

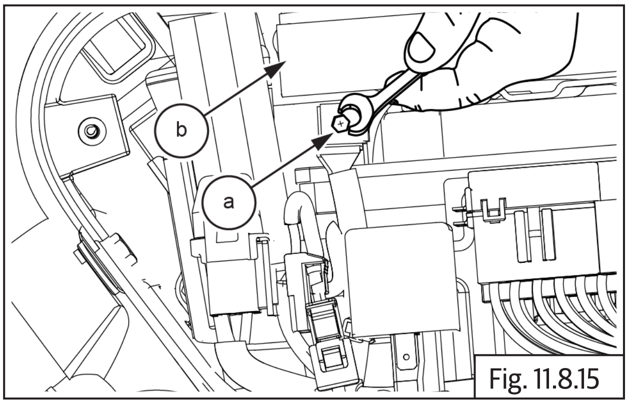


Fig. 11.8.15

🔧	10 mm Double end spanner

- Connect battery negative (-) terminal **(a)** and tighten Hex head bolt **(M6) (b)**.

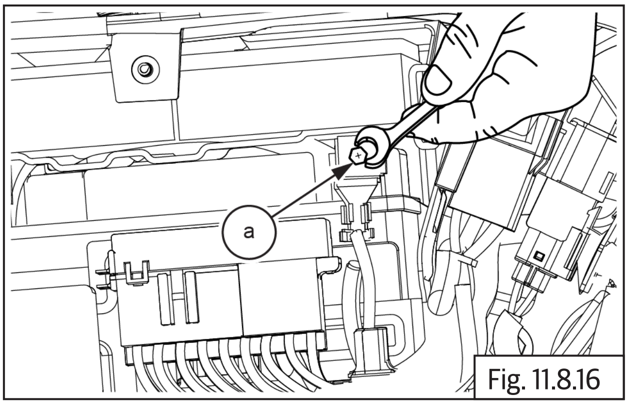


Fig. 11.8.16

🔧	10 mm Double end spanner

- Clean and apply recommended agents on battery terminals.

11.9 Trafficators Assembly

11.9.1 Direction Trafficator Bulb - Front

- Install bulb **(a)** into holder**(b)**.

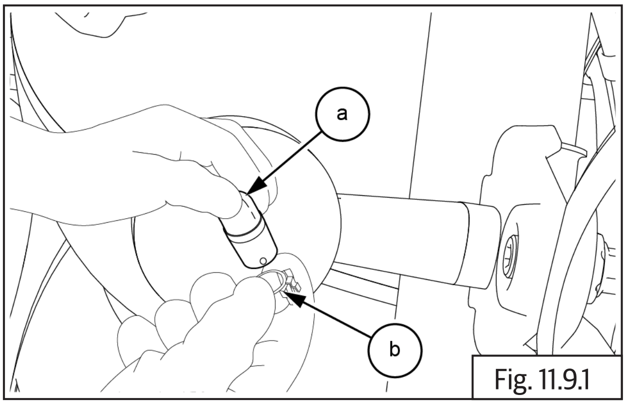


Fig. 11.9.1

- Install holder **(a)** along with bulb into lens.

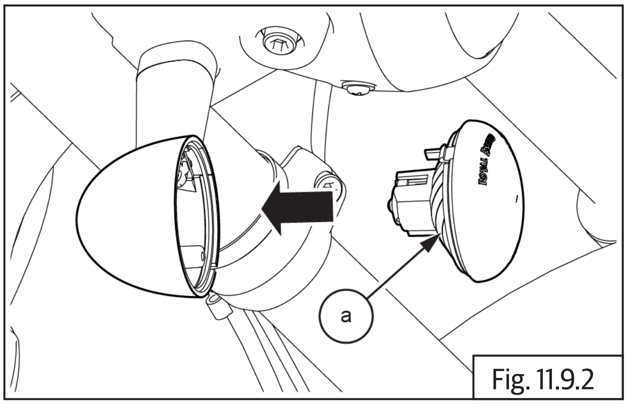


Fig. 11.9.2

- Locate and tighten screw **(a)** along with washer **(b)** into front trafficator lens RH.

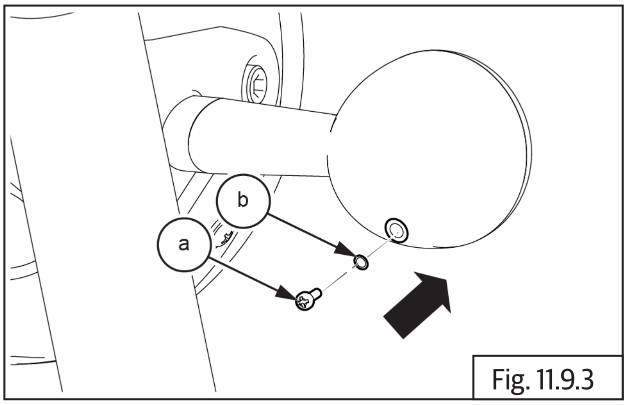


Fig. 11.9.3

🔧	Philps Screw driver

NOTE
• *After assembling headlamp assembly, check light operation.*

11.9.2 Direction Trafficators - Rear

- Locate trafficator into tail lamp housing.
- Locate and insert hex nut **(M12) (a)** along with washer **(b)**.to install rear trafficator **(c)**.

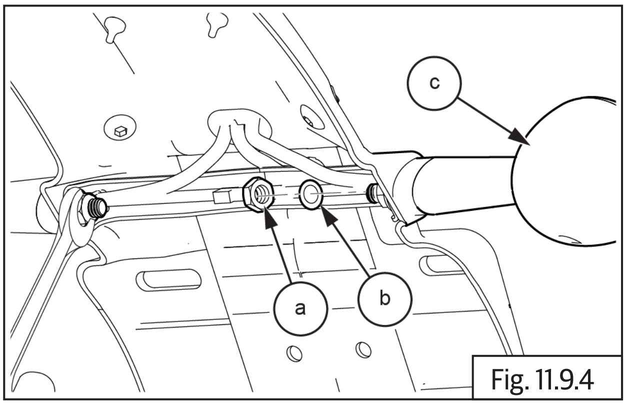


Fig. 11.9.4

	19 mm Ring spanner

- Support and install fender into mudguard.

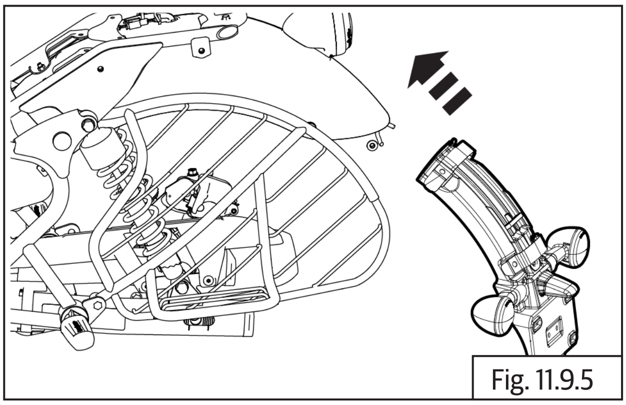


Fig. 11.9.5

11.10 Brake Lamp Connectors Assembly

11.10.1 Brake Lamp Connector - Rear

- Refer ABS section for assembly of rear brake light swiitch.

NOTE
- *After assembling rear brake lamp switch, check brake light operation.*

11.10.2 Brake Lamp Connector - Front

- Connect front brake lamp connector **(a)**.

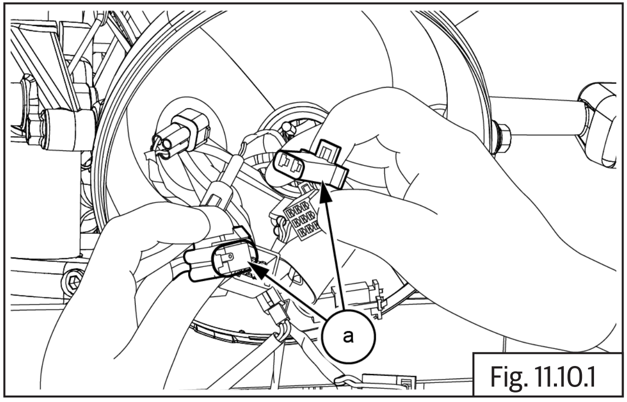


Fig. 11.10.1

- After assembling front brake switch. Check front brake operation at Tail lamp

11.11 Tail Lamp Assembly

11.11.1 Tail Lamp

NOTE
- *Tail lamp is a sealed LED unit and is not serviceable. Hence it has to be replaced as a whole assembly if found malfunctioning.*

11.12 Headlamp and Cluster Assembly

11.12.1 Headlamp Housing Holders into Fork Legs

- Assemble LH & RH headlamp housing holders **(a)** into front fork legs LH & RH **(b)**.

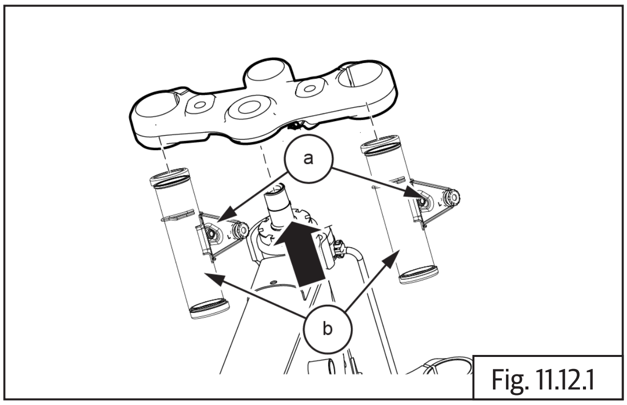


Fig. 11.12.1

- Assemble upper yoke **(a)** into steering stem.

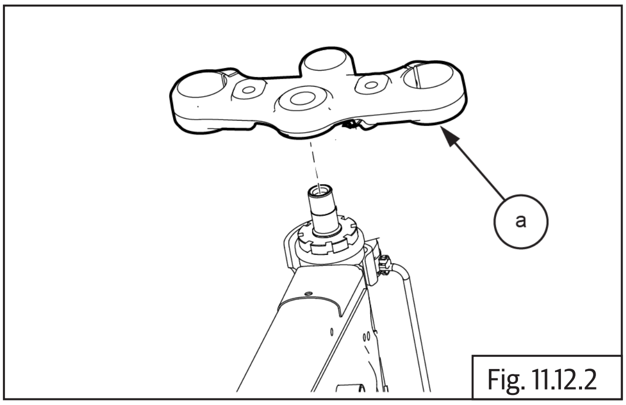


Fig. 11.12.2

11.12.2 Cluster Assembly

- Insert cluster bracket **(a)** into upper yoke **(b)**.

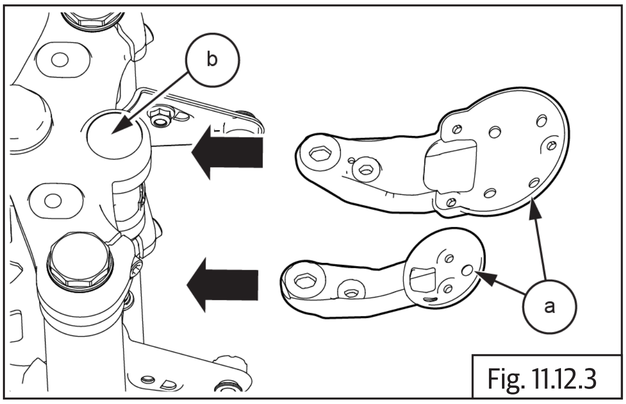


Fig. 11.12.3

- Insert and tighten 2 Nos. Hex socket head bolts **(M10) (a)** along with washers into LH and RH of cluster bracket.

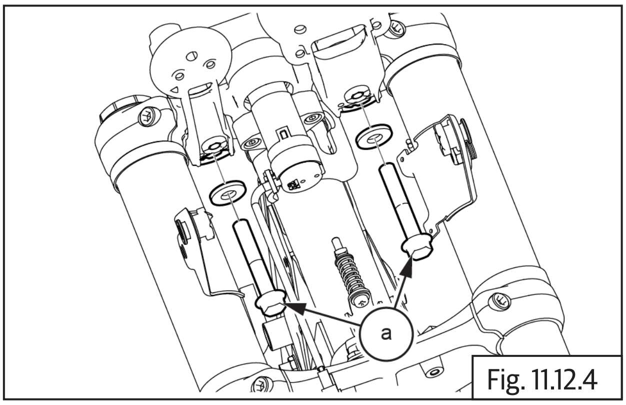


Fig. 11.12.4

🔧	14 mm socket with Ratchet
Torque	42-58 N-m/4.2-5.8 kgf-m

- Insert and tighten 2 Nos. Hex socket head bolts **(M6) (a)** along with washers into LH and RH of cluster bracket.

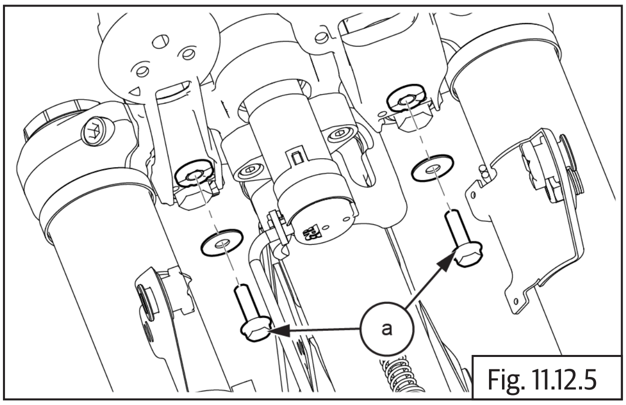


Fig. 11.12.5

🔧	10 mm Allen socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Locate TBT cluster **(a)** into bracket **(b)**.

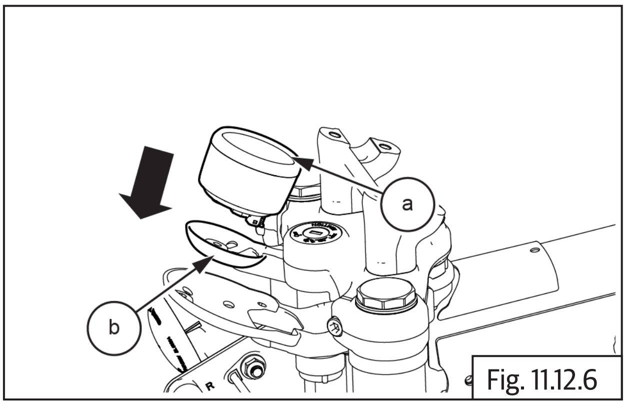


Fig. 11.12.6

- Locate and tighten 2 Nos allen head bolts **(a)** into bracket **(b)**.

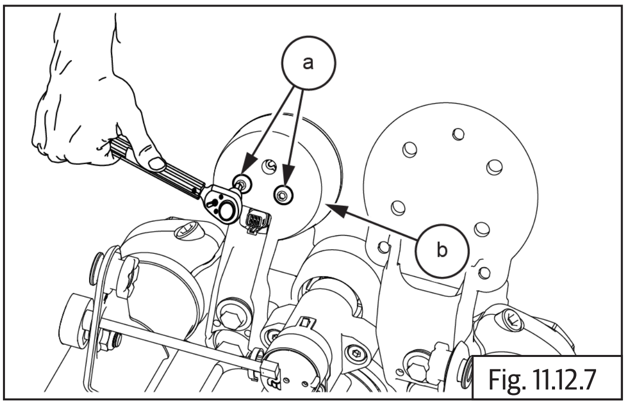


Fig. 11.12.7

🔧	3 mm Allen socket with ratchet.

- Locate Instrument cluster **(a)** into bracket **(b)**.

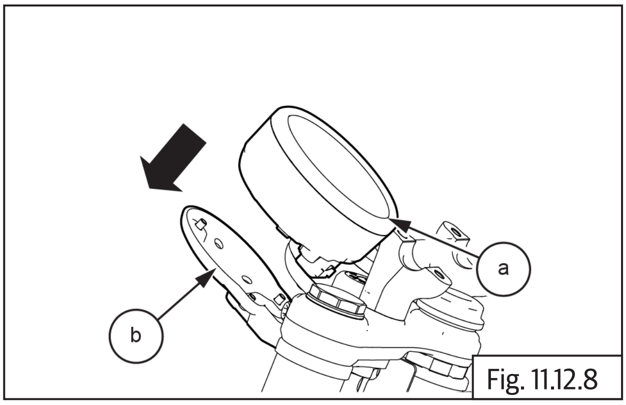


Fig. 11.12.8

- Locate and tighten 3 Nos allen head bolts **(a)** into bracket **(b)**.

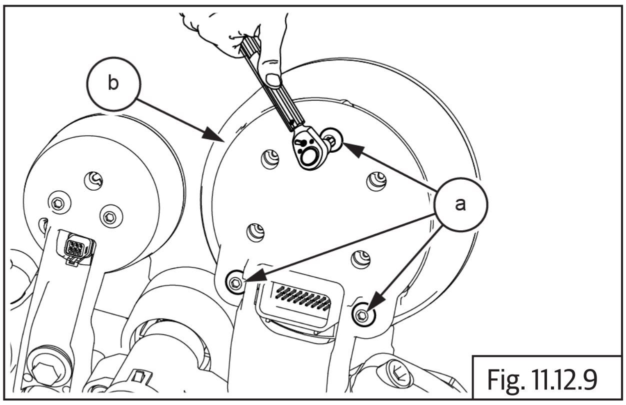


Fig. 11.12.9

🔧	3 mm Allen socket with ratchet.

- Locate and connect instrument cluster connector **(a)**. Ensure it is properly seated/locked.

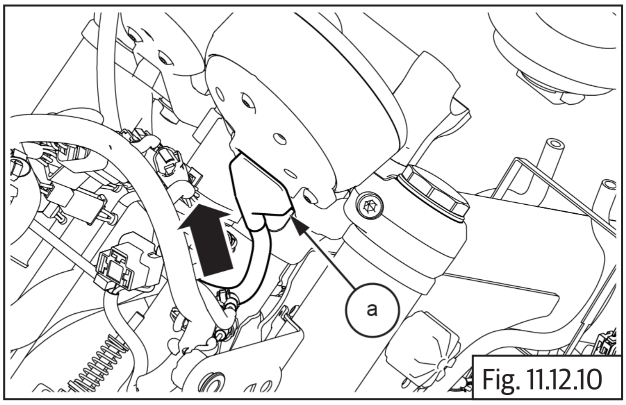


Fig. 11.12.10

- Locate and connect TBT cluster connector **(a)**. Ensure it is properly seated/locked.

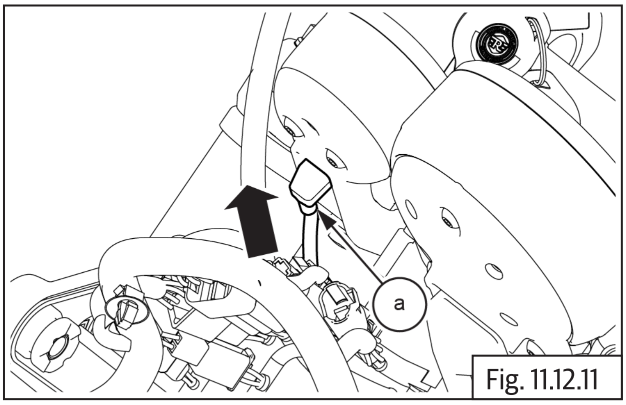


Fig. 11.12.11

- Locate ignition key set **(a)** into cluster bracket.

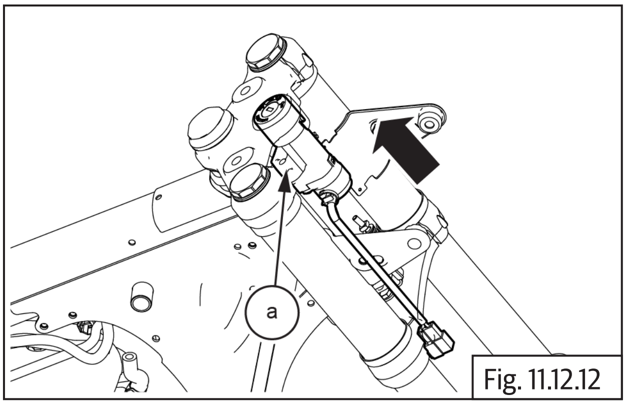


Fig. 11.12.12

- Insert and tighten 2 Nos. Hex socket head bolts **(M6) (a)** into LH & RH of key set.

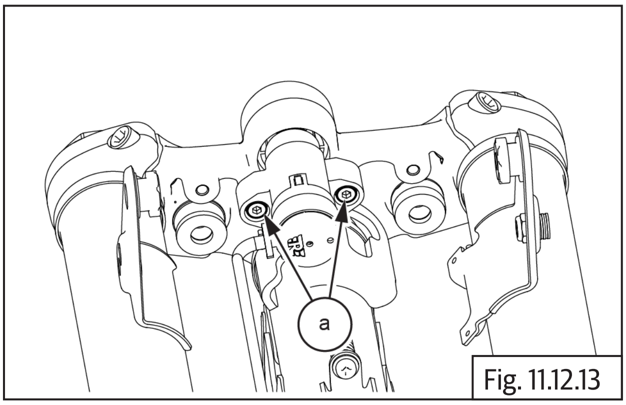


Fig. 11.12.13

🔧	5 mm Allen socket with Ratchet
Torque	8-12 N-m/0.8-1.2 kgf-m

- Connect cluster connection (section 11.12.5).

11.12.3 Direction Trafficators into Headlamp Holder

- Assemble LH direction trafficator **(a)** along with nut **(b)** washer **(c)** into headlamp holder. Similarly assemble RH direction trafficator.

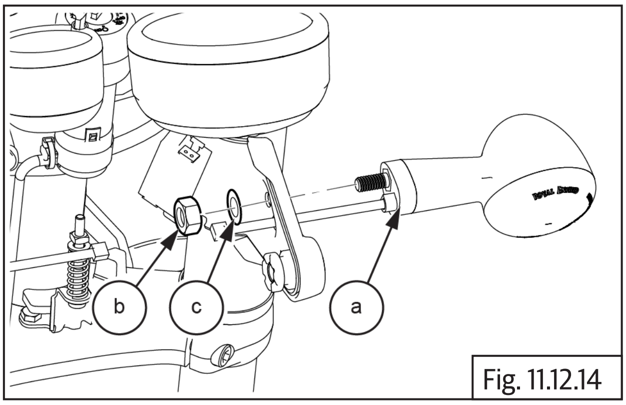


Fig. 11.12.14

- Insert and tighten Hex nut **(M12) (a)** to fix LH & RH direction trafficators.

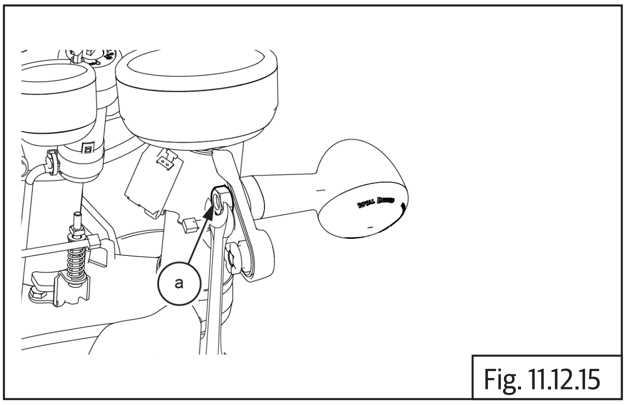


Fig. 11.12.15

🔧	19 mm Ring spanner

11.12.4 Headlamp Housing into Holder LH & RH

- Locate headlamp housing into holder and insert and tighten Hex flange holder bolts **(M8) (a)** on LH & RH housing.

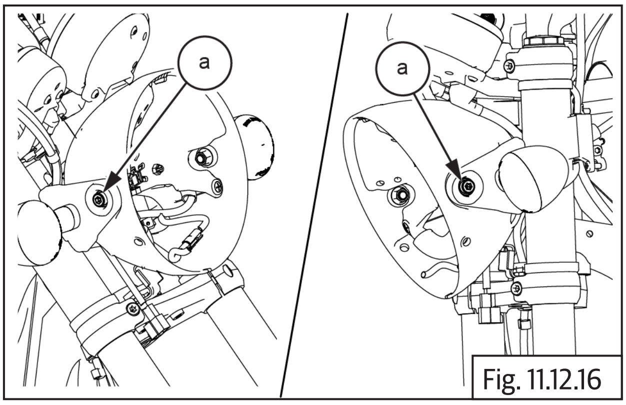


Fig. 11.12.16

🔧	12 mm Socket with Ratchet
Torque	21-29 N-m/2.1-2.9 kgf-m

11.12.5 Connectors and Sensors into Headlamp Housing

- Locate and connect ignition switch connector **(a)**. Ensure it is properly seated/locked.

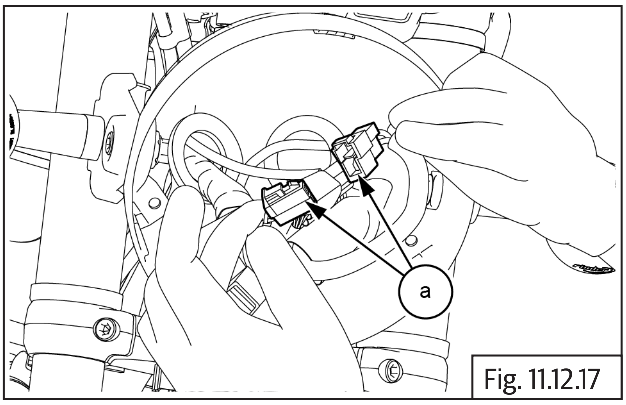


Fig. 11.12.17

- Locate and connect RH trafficator sensor connector **(a)**. Ensure it is properly seated/locked.

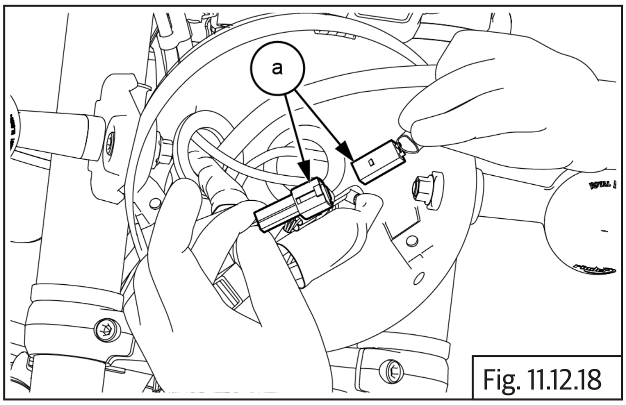


Fig. 11.12.18

- Press and lock LH trafficator sensor connector **(a)**. Ensure it is properly seated/locked.

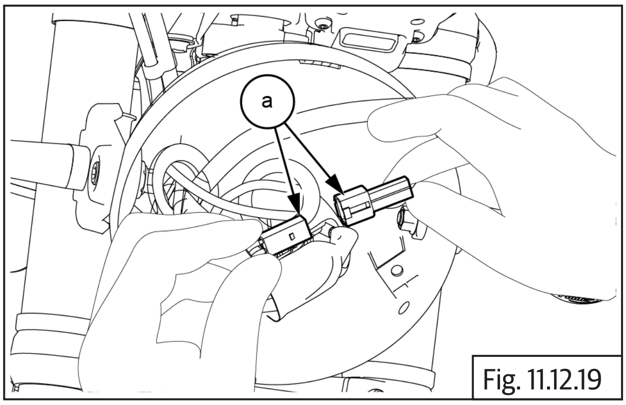


Fig. 11.12.19

- Locate and connect wheel speed sensor connector **(a)**. Ensure it is properly seated/locked.

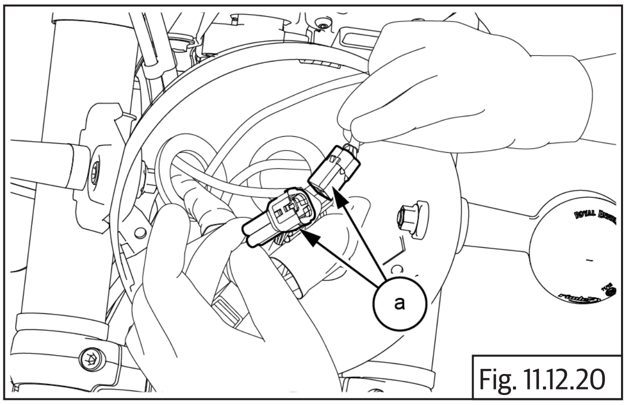


Fig. 11.12.20

- Locate and connect RH module connector **(a)**. Ensure it is properly seated/locked.

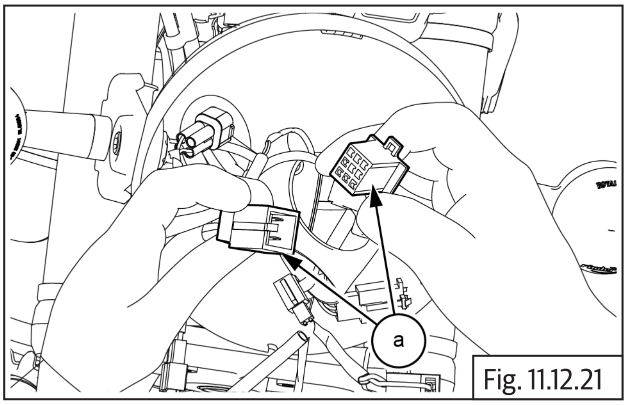


Fig. 11.12.21

- Connect front brake lamp switch connector **(a)**. Ensure it is properly seated/locked.

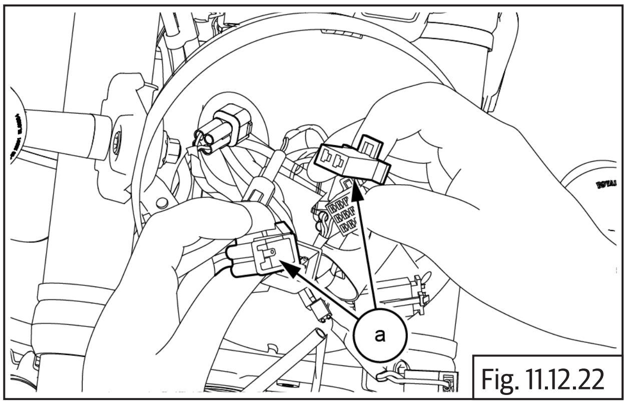


Fig. 11.12.22

- Connect clutch switch connector **(a)**. Ensure it is properly seated/locked.

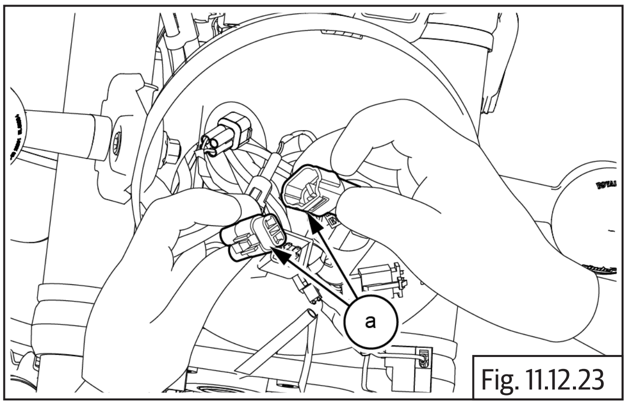


Fig. 11.12.23

- Locate and connect LH module connector **(a)** into headlamp housing. Ensure it is properly seated/ locked.

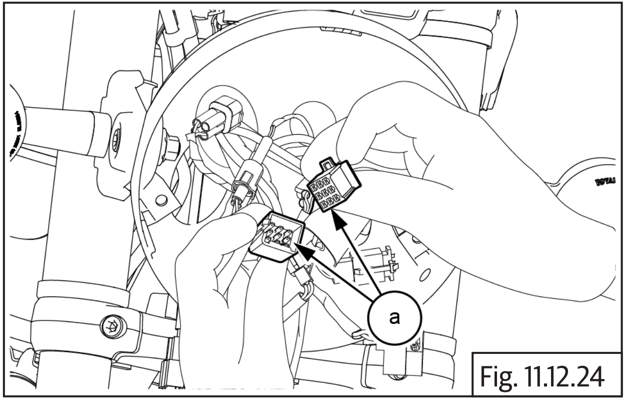


Fig. 11.12.24

- Locate clips present in the wiring harness **(a)** into the bracket **(b).**

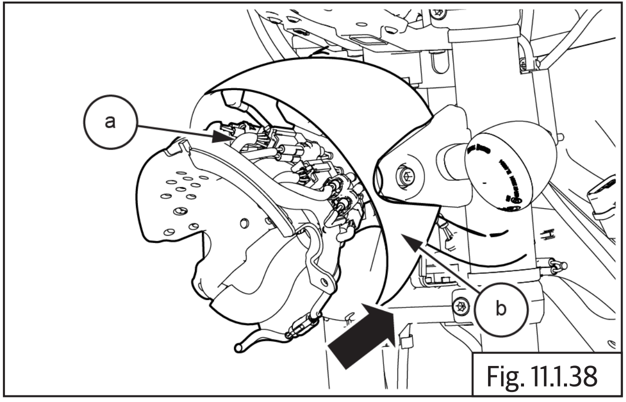


Fig. 11.1.38

- Locate the bracket **(a)** in headlamp housing assembly and tighten the plastic screws **(b)**.

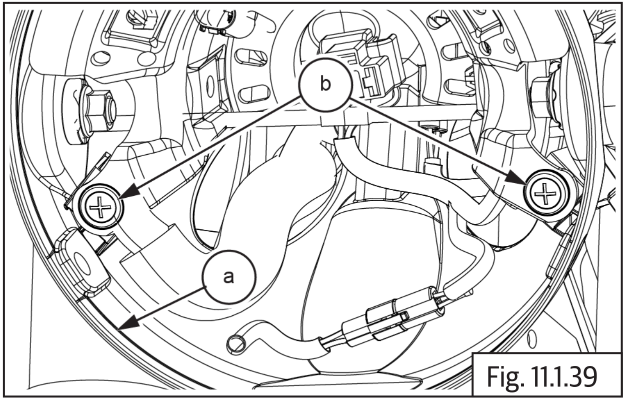


Fig. 11.1.39

🔧	Phillips screw driver

11.12.6 Headlamp Bulb into Reflector

⚠ CAUTION

Do not touch glass of bulb. Any strains or finger prints will affect the luminosity.

Ensure pointed tip of bulb does not get damaged

Whenever handling the bulb, hold it firmly at terminal end and not at glass end.

- Gently locate headlamp bulb **(a)** into reflector and install wire clip **(b)** onto reflector **(c)**.

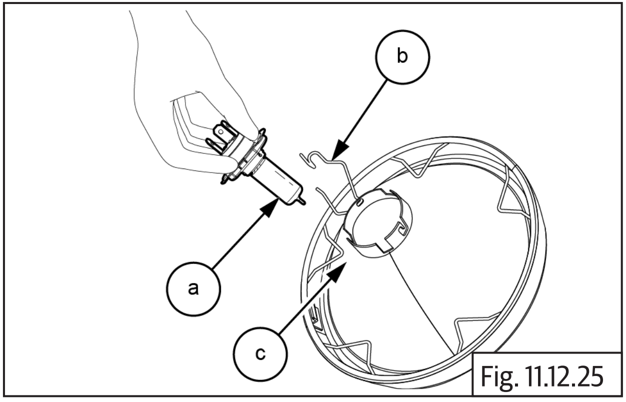


Fig. 11.12.25

- Press wire clip **(a)** and lock into slot **(b)** in headlamp reflector.

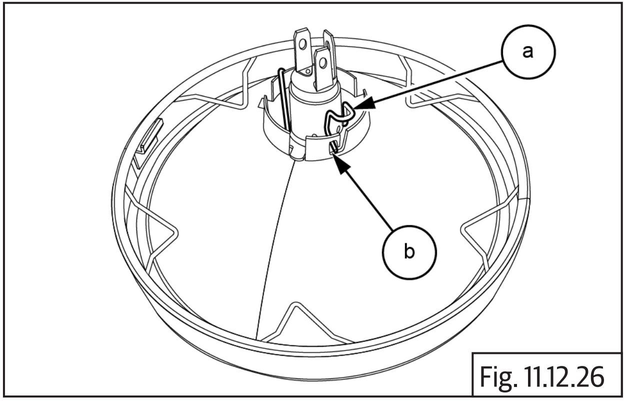


Fig. 11.12.26

- Locate headlamp gromet on headlamp assy **(a)**.

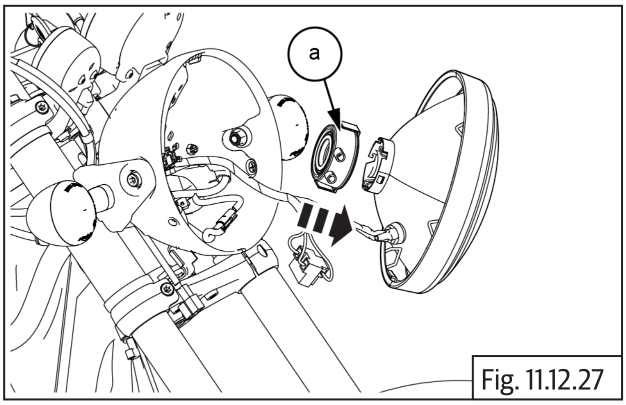


Fig. 11.12.27

11.12.7 Pilot Bulb into Reflector

- Connect pilot bulb coupler **(a)** to reflector.

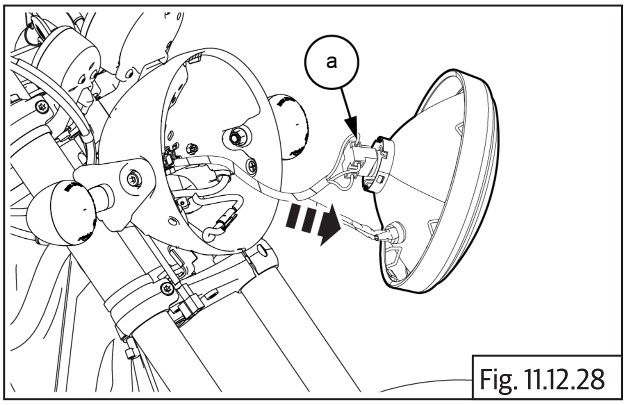


Fig. 11.12.28

11.12.8 Headlamp Reflector into Housing

- Hold headlamp **(a)** carefully and connect headlamp connector **(b)** into headlamp bulb **(c)**.

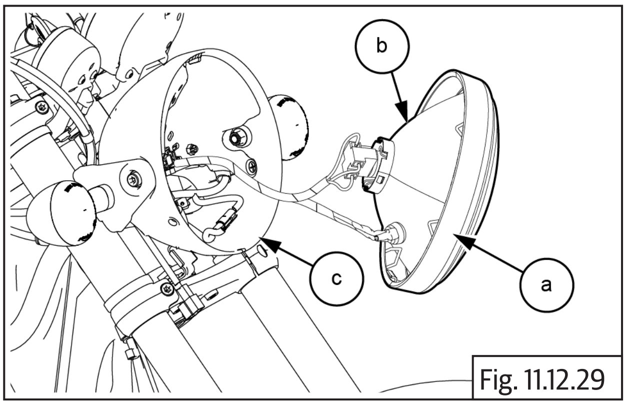


Fig. 11.12.29

⚠ CAUTION

Support the headlamp assembly properly and carefully.

- Carefully assemble reflector **(a)** along with into housing.

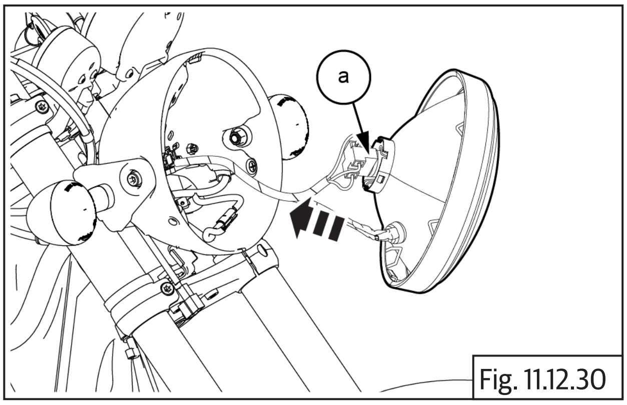


Fig. 11.12.30

- Insert and tighten 2 Nos Phillips screw **(a)** on headlamp.

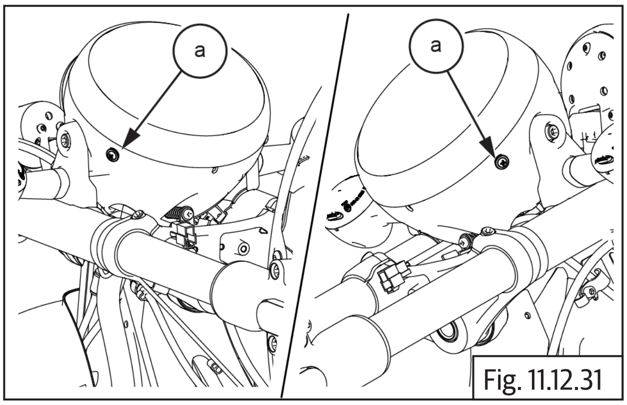


Fig. 11.12.31

🔧	Phillips screw driver

- Inspect and test all electrical functions after completing assembly.

EMS - DIAGNOSIS

EMS - DIAGNOSIS

Contents

1. P0197-Engine Oil Temperature Sensor Circuit Low 487
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5. P0627-Fuel Pump circuit Low/open 553
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19. P0335-Crank Sensor Error........ 814
20. P0336- Crank Sensor Synchronization Lost........ 829
21. P0339-Crank Sensor Gap Position Incorrect........ 844
22. P0371-Crank Sensor Additional Tooth Detected 859
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24. P0373-Crank Sensor Additional Edges Inside Filtering Period 889
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32. P2300-Ignition Coil Circuit Low/open 1012
33. P2301-Ignition Coil Circuit High 1026
34. P0112-Intake Air Temperature Low 1040
35. P0113-Intake Air Temperature High 1042
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37. P0108-Manifold Absolute Pressure High........ 1046

38. P0121-Throttle Position Sensor Circuit Adaptation Out of Control........1048
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46. P1532- Roll Over Sensor Signal Wrong........1064
47. P1533-Roll Over Sensor Serial Peripheral Interface Wrong........1066
48. P1535-Roll Over Sensor Index Wrong........1068
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52. U0009-CAN Malfunction........1076
53. U0121-CAN Diagnosis Error........1091
54. U0415-CAN Diagnosis Error........1106

P 0197 - ENGINE OIL TEMPERATURE DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Code
1	P0197	Engine oil temperature sensor	Engine oil temperature sensor Circuit Low

NOTE
• *Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/ couplers*

- **Procedure for selected DTC**

a. Error Description:

Engine oil temperature sensor (Engine oil temperature) is also called as coolant temperature sensor
TROUBLE CODE: DTC CODE: P0197

Type of error : Engine oil temperature sensor circuit Low

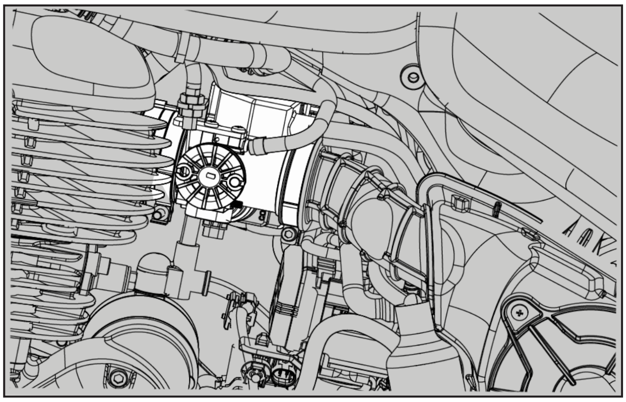
(i) Information : Engine oil temperature sensor circuit fault / Engine oil temperature sensor internal fault

b.Preliminary Checks (Basic Check Points):

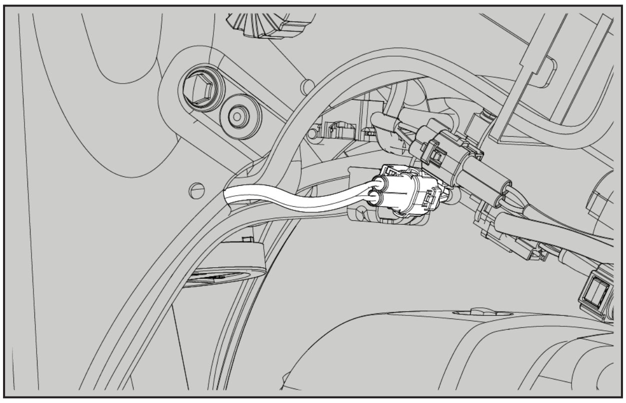
⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

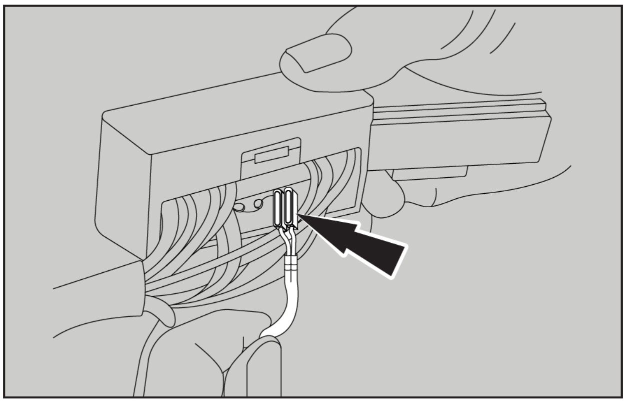
- ECU coupler is located in the Throttle body Assembly



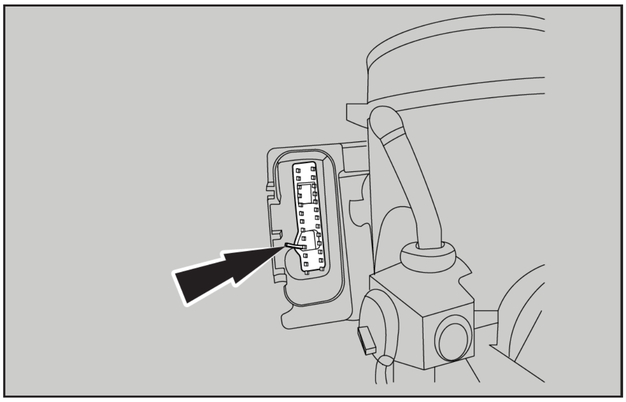
- Engine oil temperature sensor coupler is located near Cylinder head



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

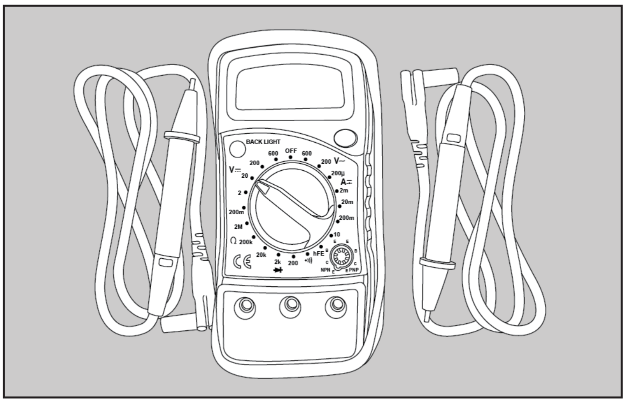
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

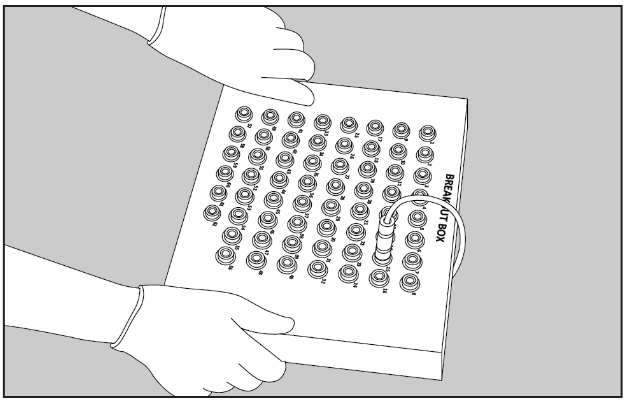
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

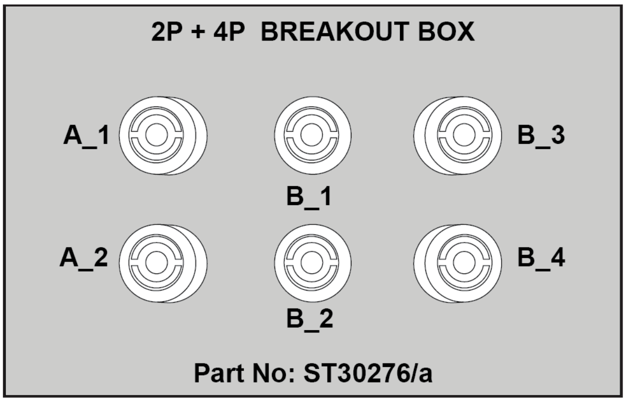
- **Tools Required**
- Multimeter (Universal)



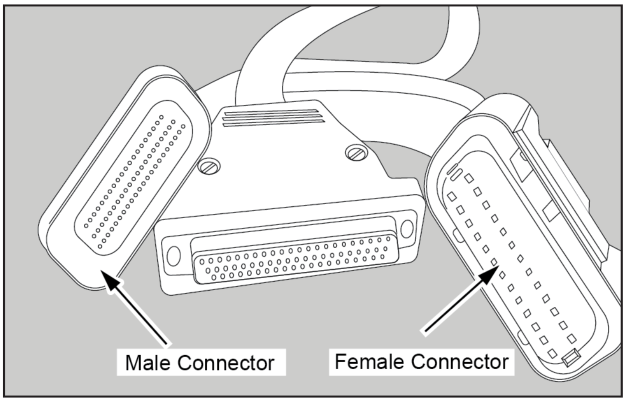
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit

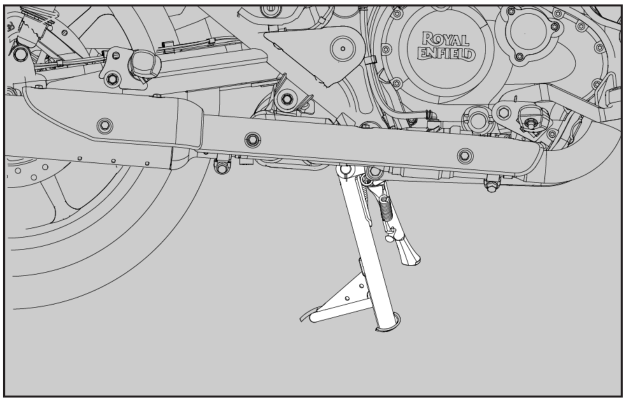

2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

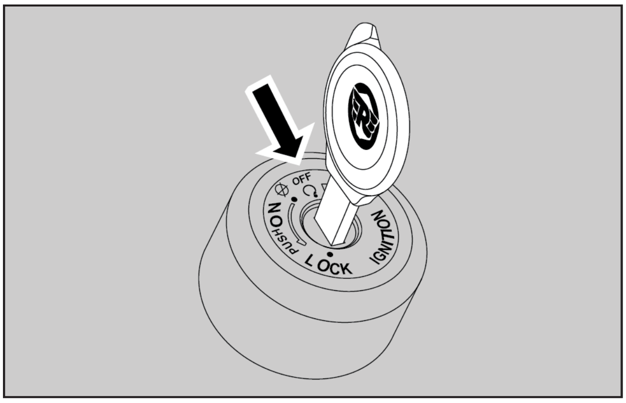

Male Connector
Female Connector

b. Pre-Checks:

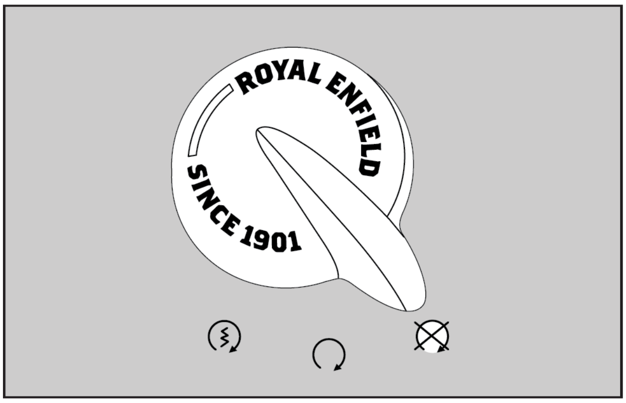
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

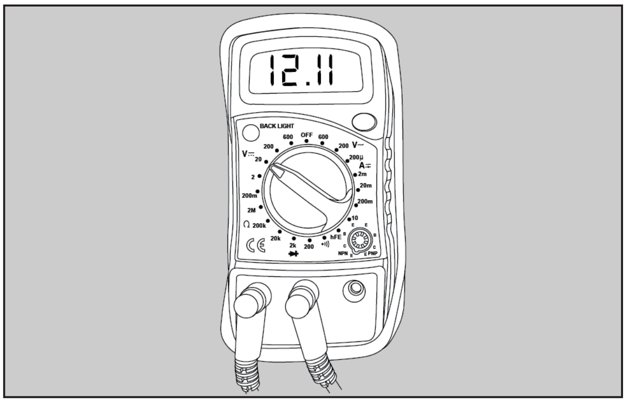

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

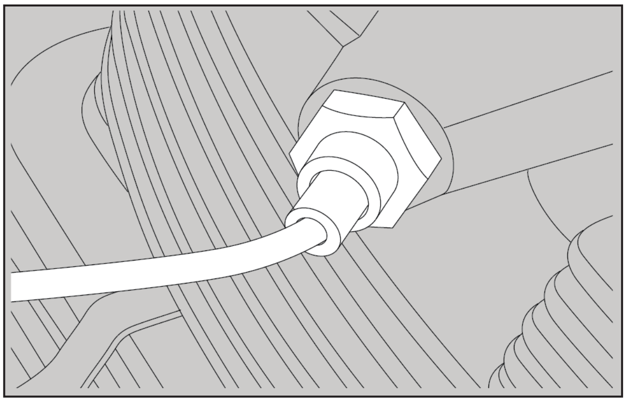
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Engine oil temperature sensor*

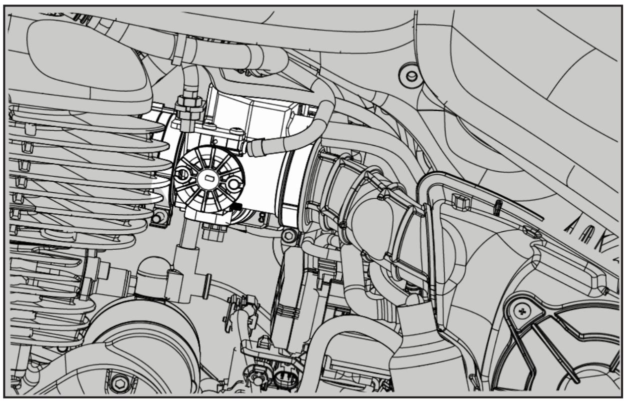
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

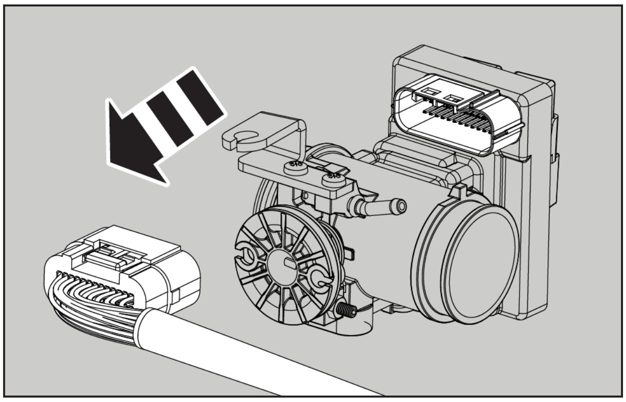
- Engine oil temperature sensor is located in the cylinder head



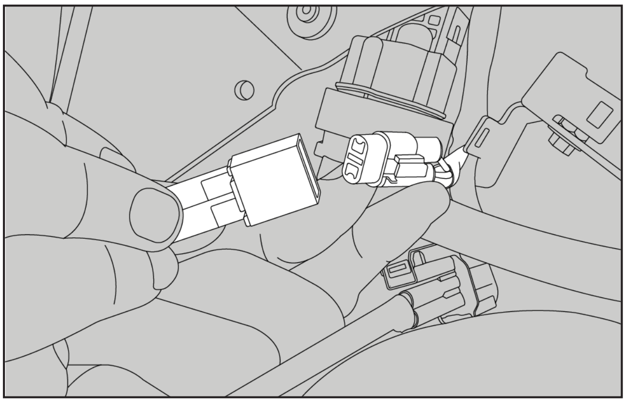
- ECU is located in the throttle body assembly



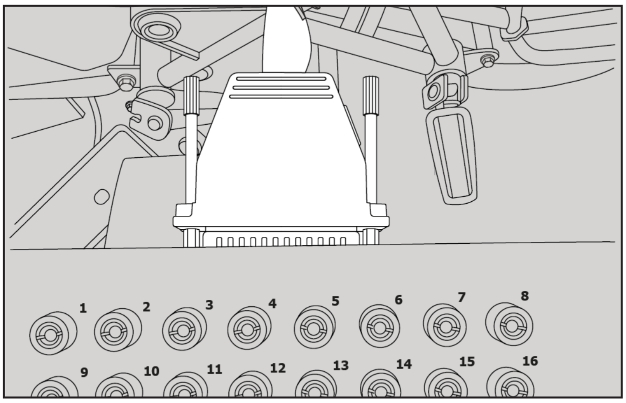
- Disconnect ECU coupler.



- Disconnect Engine oil temperature sensor coupler.



- Connect ECU breakout box harness coupler to Breakout box harness (62 Pin Kit)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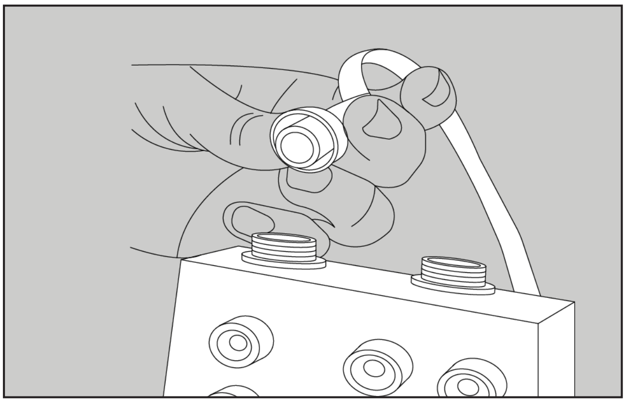
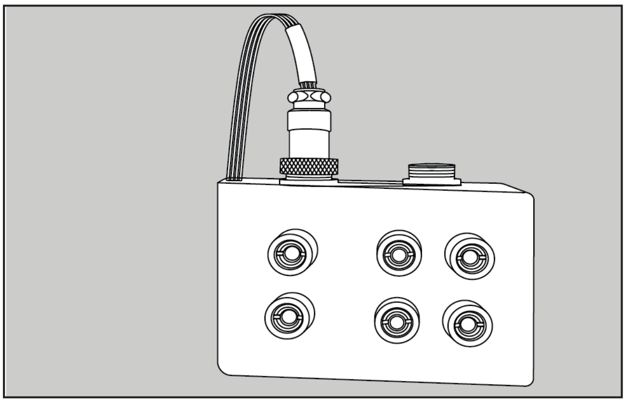
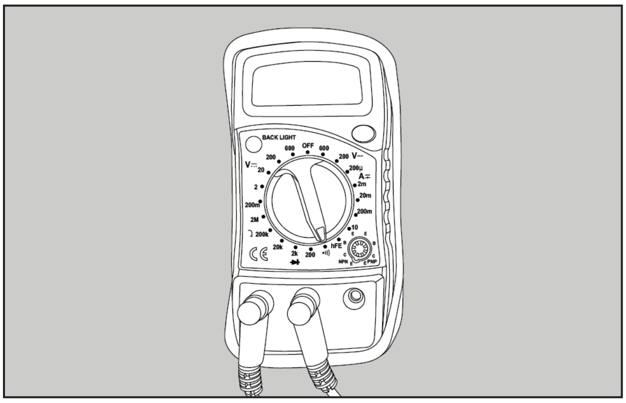
- Connect Engine oil temperature sensor breakout box harness to Sensor break out box.



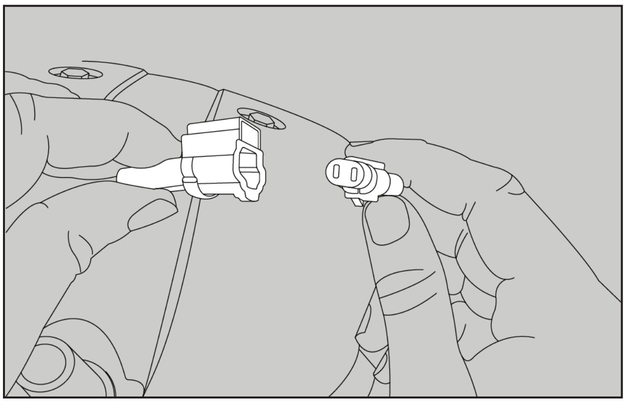


a. To check Continuity of Wiring harness

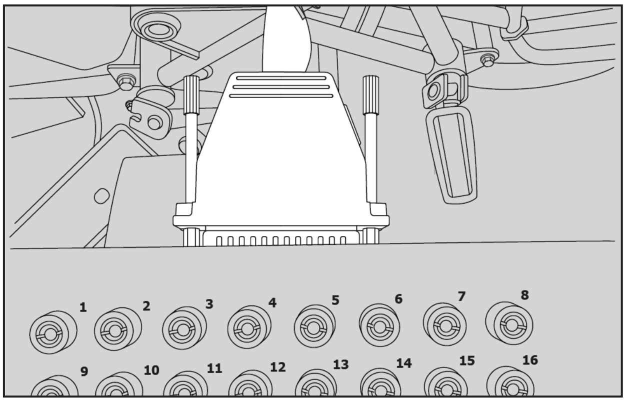
- Keep the multimeter in continuity mode


BACK LIGHT
OFF

- Connect the Engine oil temperature sensor breakout wiring harness to sensor wiring harness coupler



- connect the ECU breakout box harness to ECU wiring harness coupler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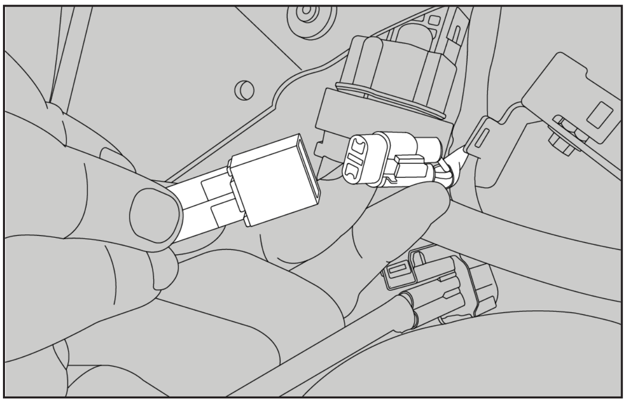
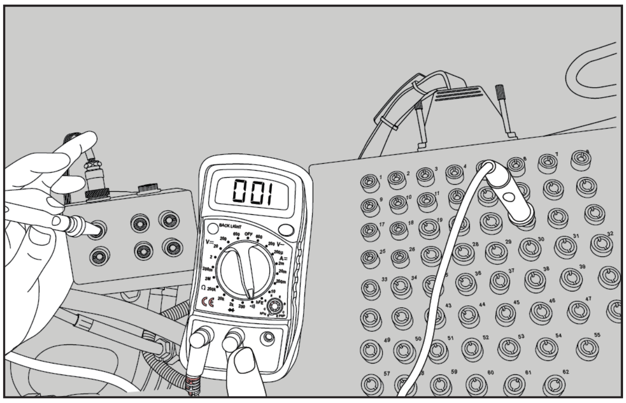
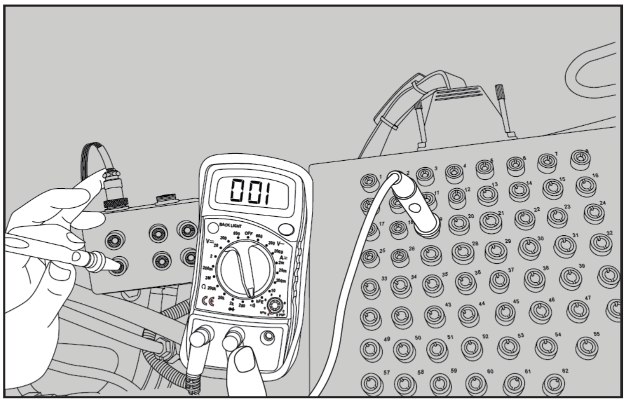


- Keep the multimeter positive probe in socket 1 of the sensor break outbox and negative probe in socket 22 of the ECU breakout box. Check for continuity (Beep Sound from the multimeter)

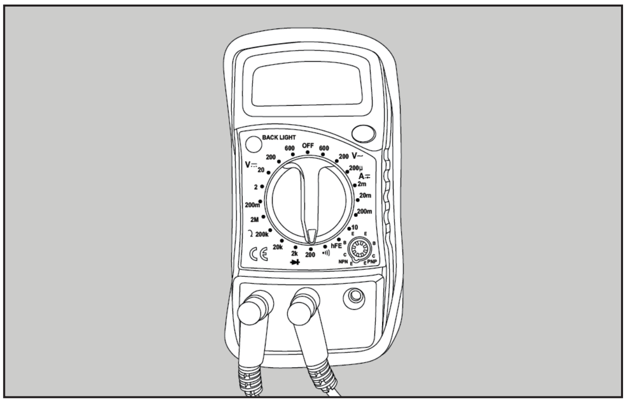


- Keep the multimeter positive probe on socket 2 of the sensor break outbox and negative probe on socket 19 of the ECU breakout box. Check for continuity (Beep Sound from the multimeter)

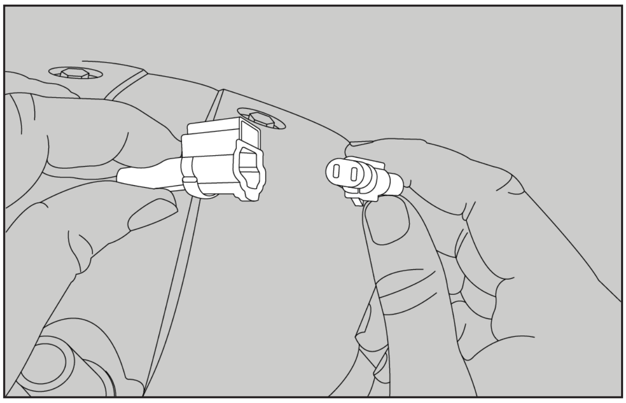


b. To check the resistance of Sensor

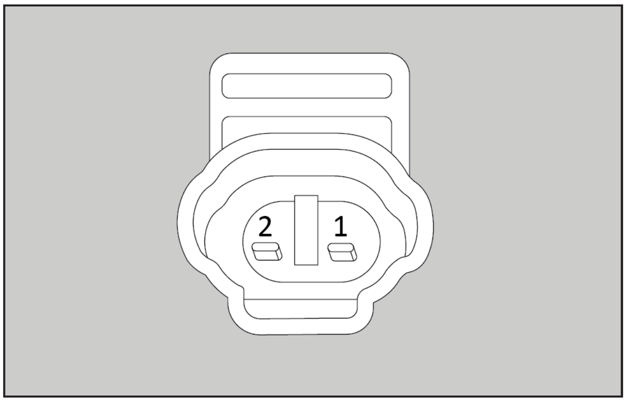
- keep the multimeter in Resistance mode (200 Ohms)

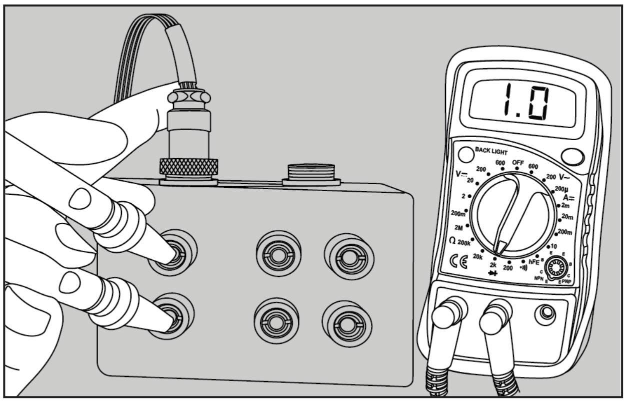


- Connect the Engine oil temperature Sensor break out box harness to Engine oil temperature sensor coupler



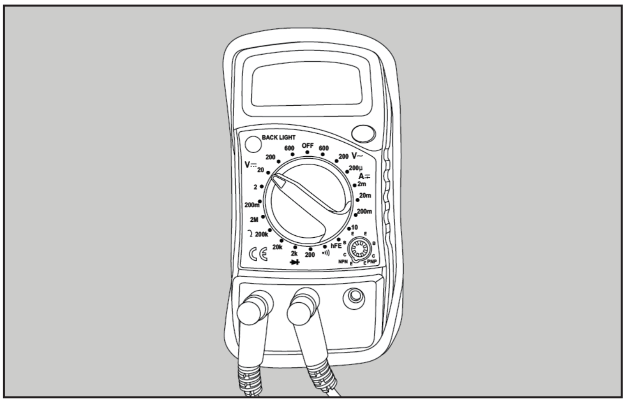
- To check the Resistance value of the engine oil temperature sensor, connect the multimeter in Socket 1 and Socket 2 of the breakout box - 2P +4P Pin kit. The resistance value is to be between 3.09kΩ to 75.88kΩ considering a range of - 20 Deg C to + 60 Deg C without warm-up condition.
- After Engine warm-up for 3 minutes and then check the resistance between Socket 1 and Socket 2 the resistance value is to be less than 1.5 KΩ.



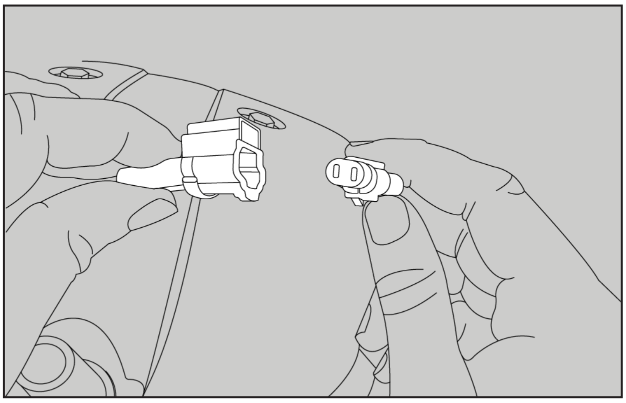


C. To check output voltage

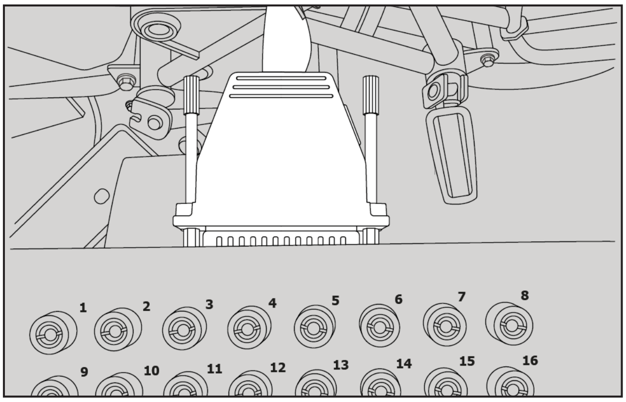
- Keep the multimeter in voltage mode (20V)


BACK LIGHT
OFF

- Connect the Engine oil temperature sensor breakout wiring harness to Engine oil temperature sensor wiring harness coupler.



- Ensure the ECU break out box harness is connected to ECU coupler and ECU wiring harness coupler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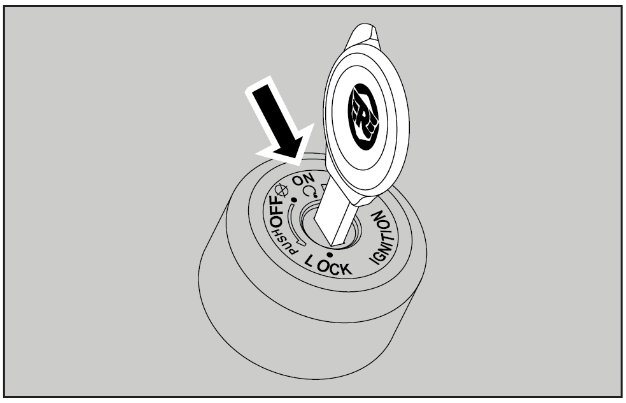
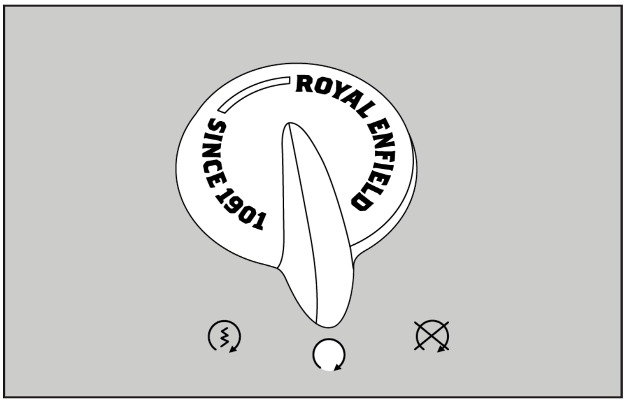
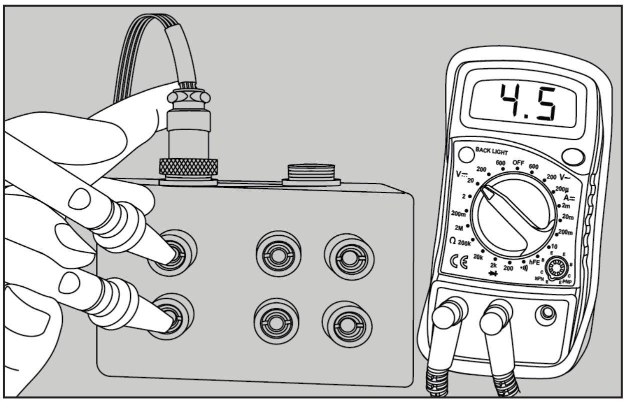
- Turn the Ignition and kill switch "ON"

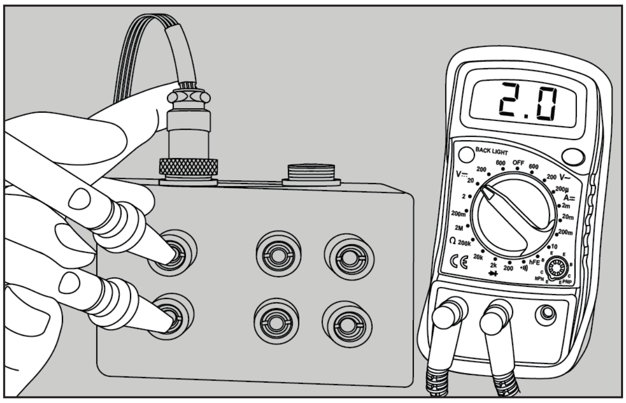

ON
PUSH OFF
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the engine and keep it in idle RPM
- Place the multimeter positive probe in Socket 2 of sensor break out box (2P+4P) and negative probe in socket 1 of sensor break outbox
- Check the voltage when the engine temperature is equal to ambient temperature (without engine warm-up). Voltage should be 3.1V to 4.87 V (- 20 Deg C to 60 Deg C)


4.5
BACK LIGHT

- Check the voltage when the engine is warmed up for 3 minutes with half throttle Voltage should be less than 2.25 V



d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (3.09kΩ to 75.88kΩ) and without engine warm-up (less than 1.5 K Ohms), you replace with Engine oil temperature Sensor
- If the voltage is not meeting the specified limit (between 3.1V to 4.87 V (- 20 Deg C to 60 Deg C) or if 0 V is observed and if continuity is available you have to replace the ECU.
- If the voltage is not meeting the specified limit (less than 2.25V at engine warm-up) or if 0V is observed and if continuity is available you have to replace the ECU.

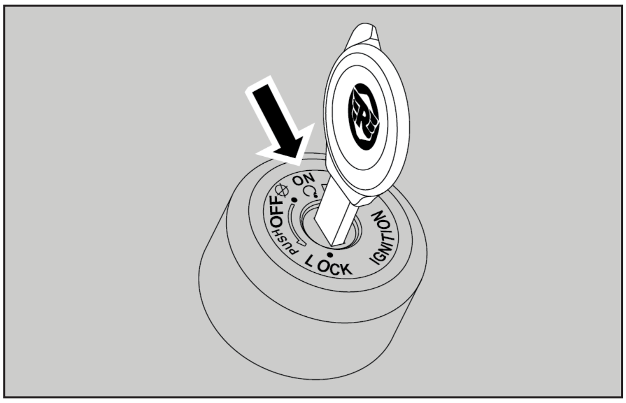
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

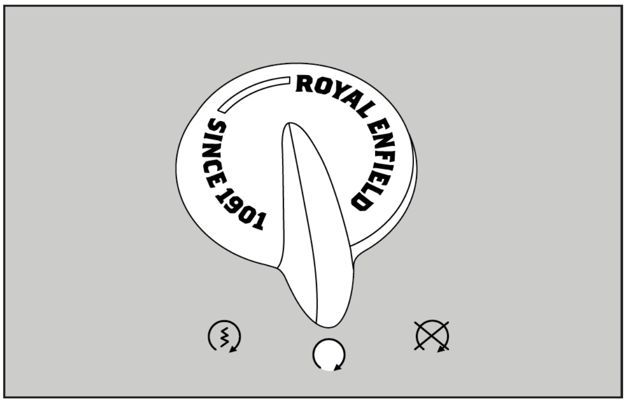
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





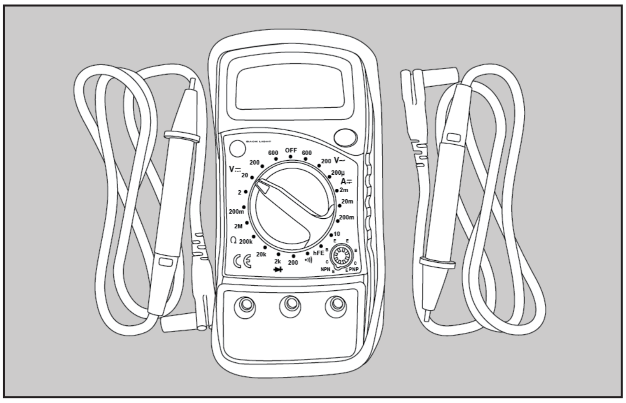
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and need to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

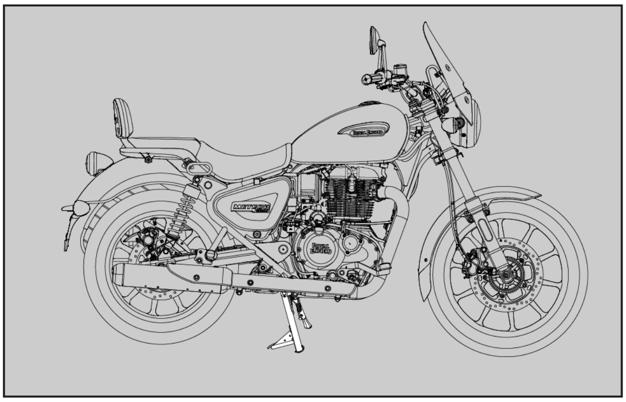


- Test lead wire (90 SERIES - ORANGE Color Wire) for Sensor
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (It will be given as hyperlink)

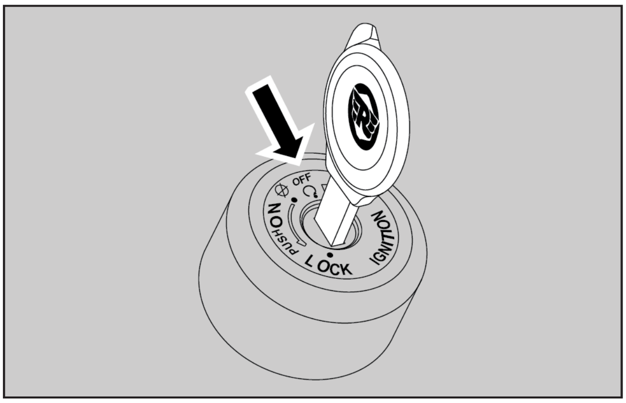
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

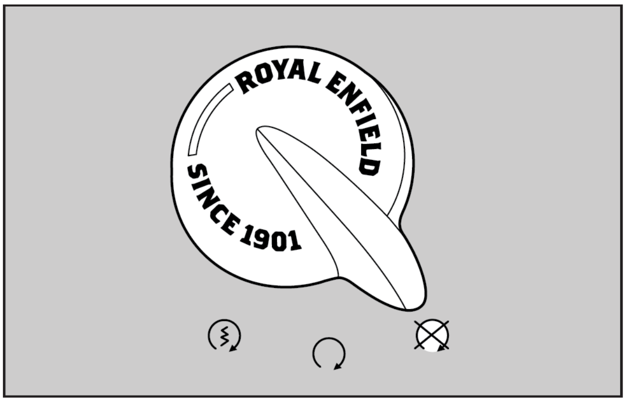
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

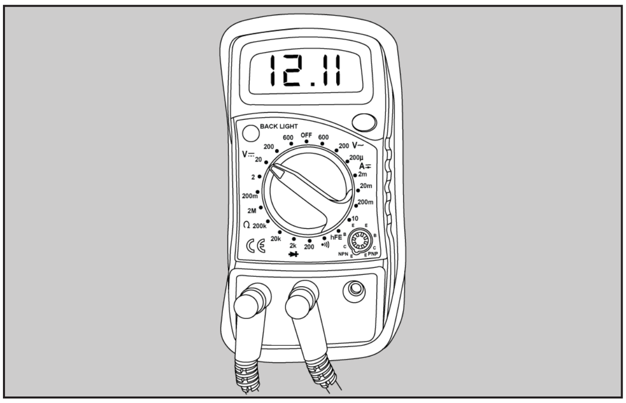


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring the above precondition only you are advised to proceed for the diagnosis steps.

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

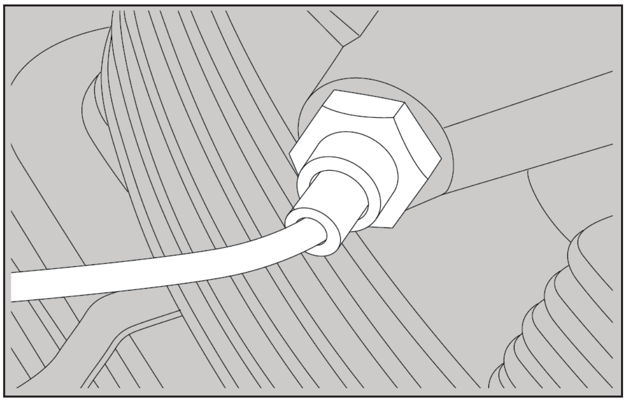
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Engine oil temperature Sensor*

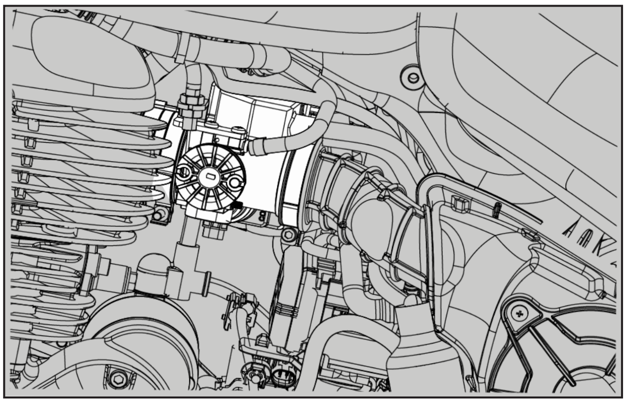
NOTE

- *Removal & refitment of Seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

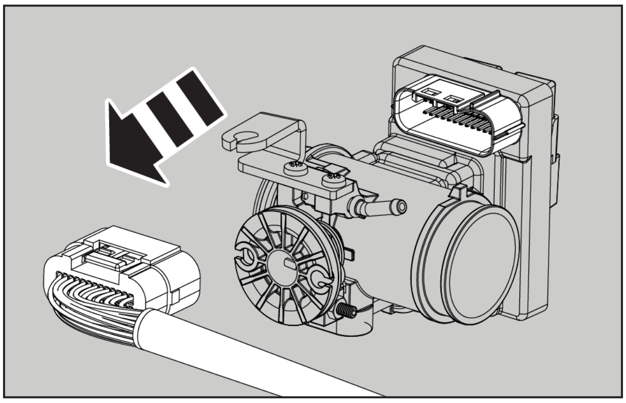
- Engine oil temperature sensor is located in the cylinder head



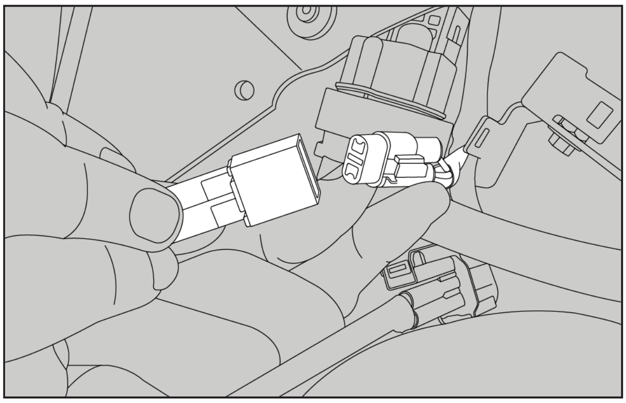
- ECU is located on the throttle body

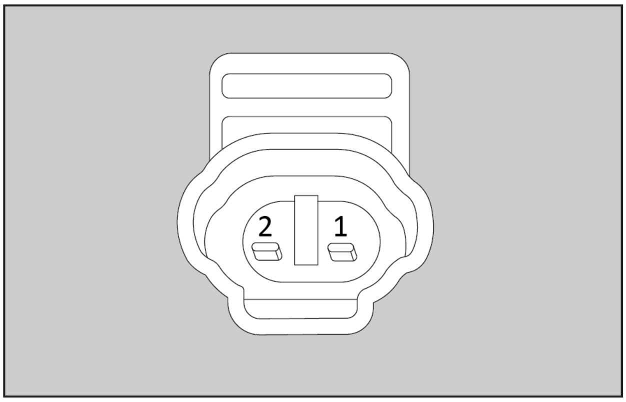


- Disconnect the ECU wiring harness coupler from ECU



- Disconnect the Engine oil temperature sensor Coupler

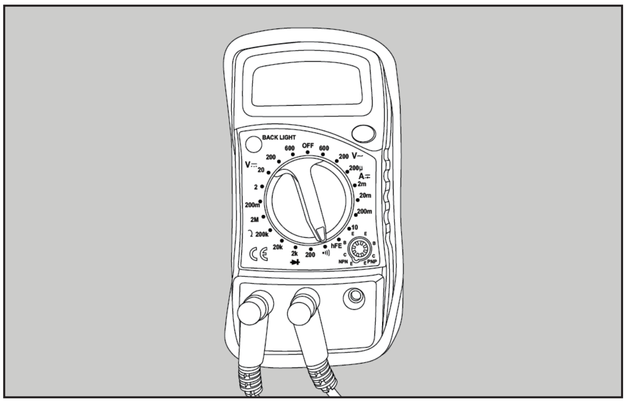




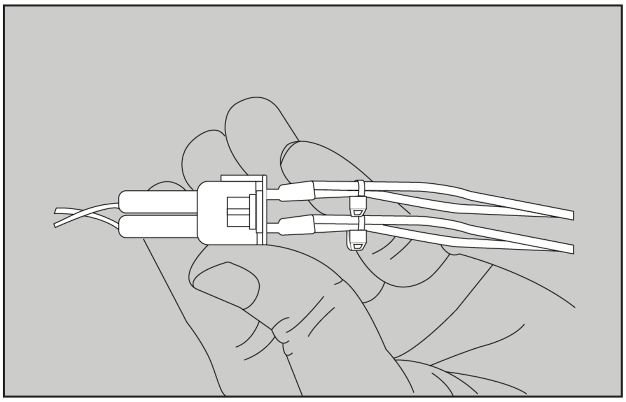
To check Continuity of the Wiring Harness

STEP 1:

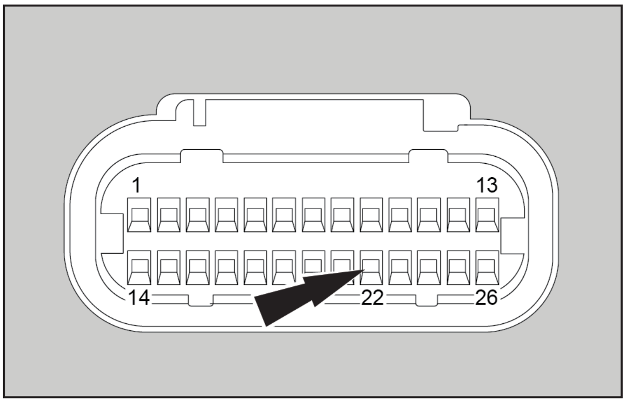
- Keep the multimeter in continuity mode



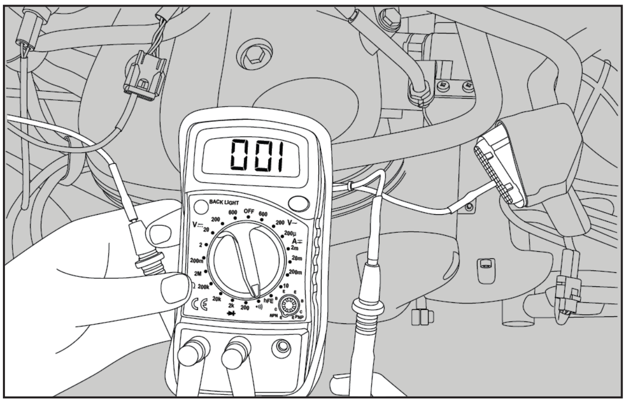
- Connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor wiring harness socket.



- Connect test lead wire 40 series (yellow color) with the black tag to Pin 22 of the ECU harness socket.

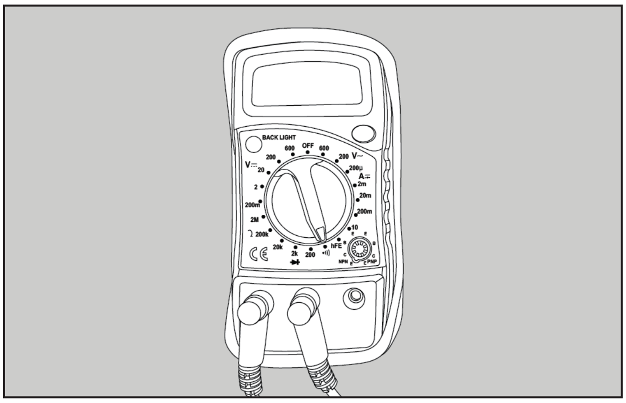


- Check for continuity (Beep Sound from the multimeter)

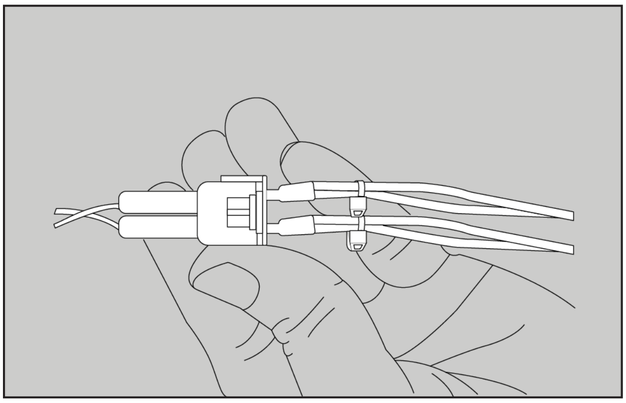


STEP2:

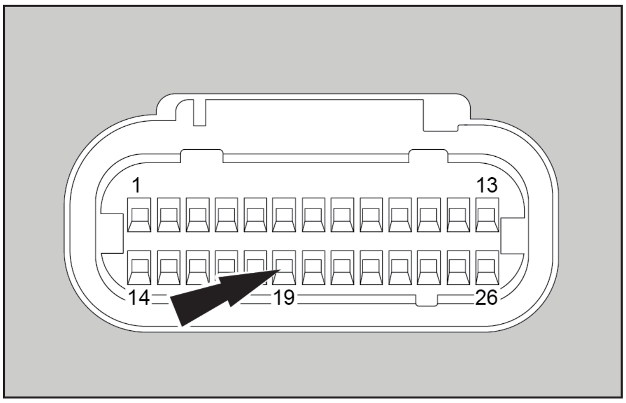
- Keep the multimeter in continuity mode



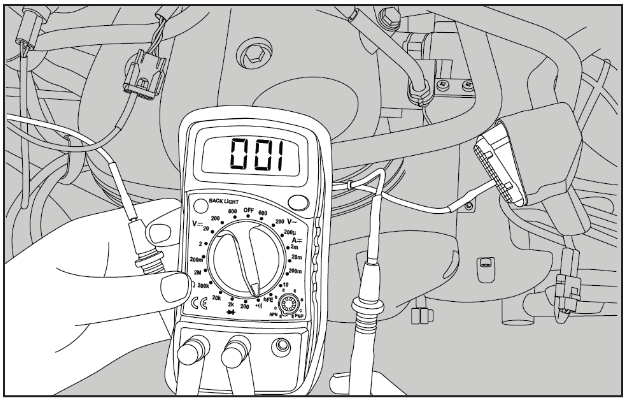
- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the sensor wiring harness socket



- Connect test lead wire 40 series (yellow color) with the red tag to Pin 19 of the ECU harness socket.



- Check for continuity (Beep Sound from the multimeter)

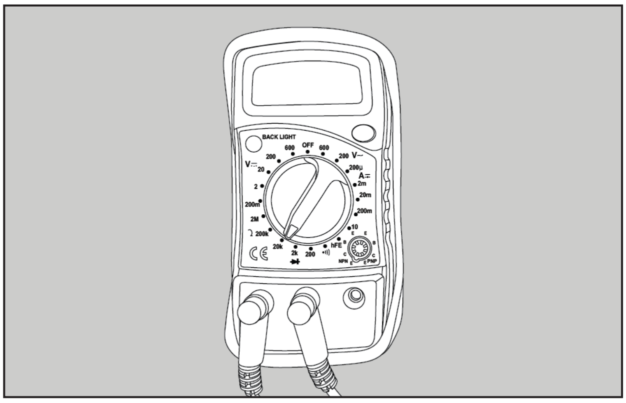


⚠ CAUTION

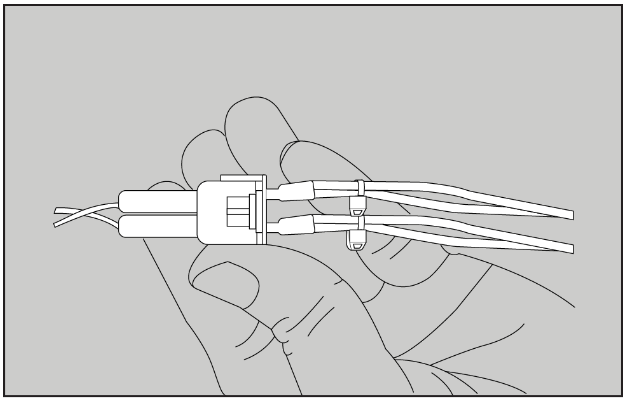
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

b. To check Resistance of the Sensor

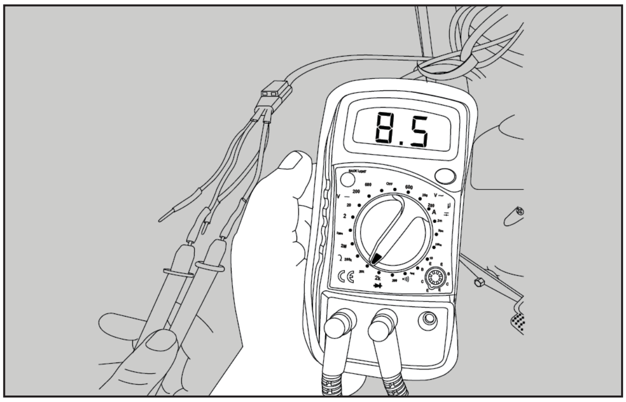
- Keep the multimeter in resistance mode (20K ohm)



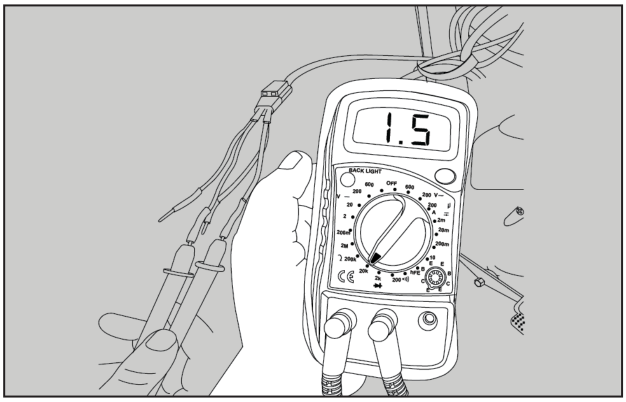
- Connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor socket and connect test lead wire 90 series (orange color) with the red tag to pin 2 of the sensor socket



- Check the Resistance between Pin1 and Pin 2. Resistance value to be between 3.09kΩ to 75.88kΩ considering a range of - 20 Deg C to + 60 Deg C (Condition: without engine warm-up condition)



- Check the Resistance between Pin1 and Pin 2. Resistance value to be less 1.5 K ohm at Engine warm-up condition (Condition: 3-minute warmup with half throttle)

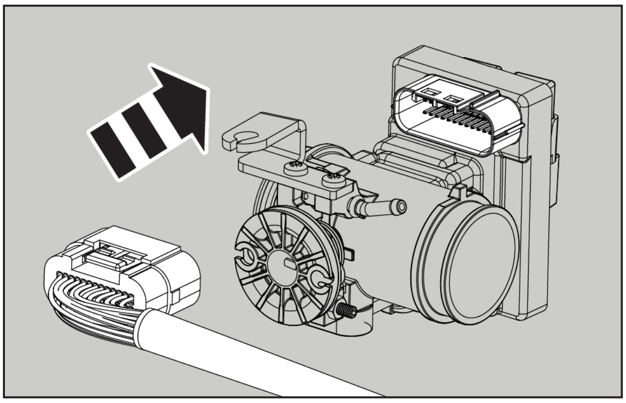


⚠ CAUTION

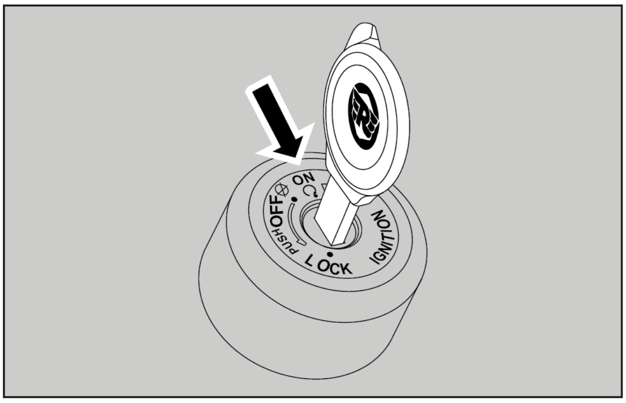
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

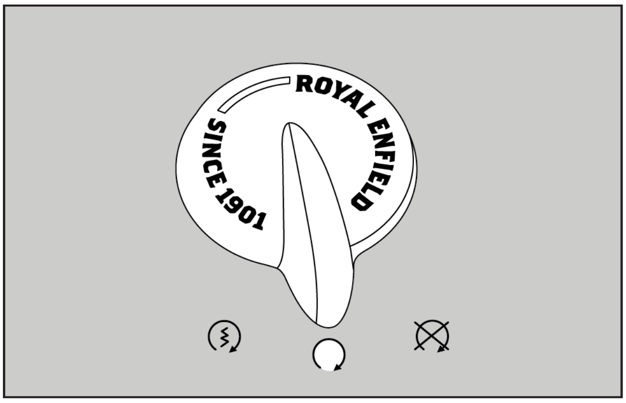
c. To check the Output voltage

- Connect the ECU coupler to ECU

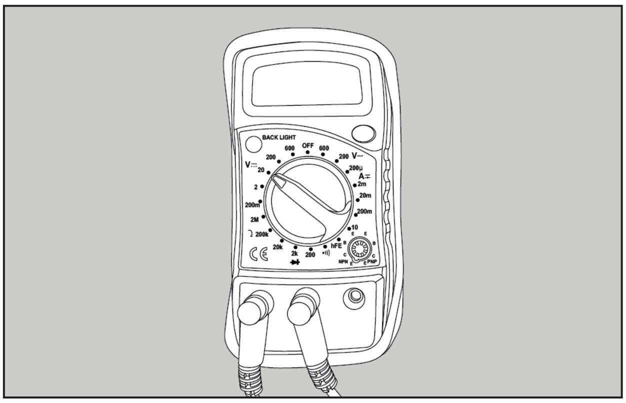


- Turn “ON” the Ignition and kill switch

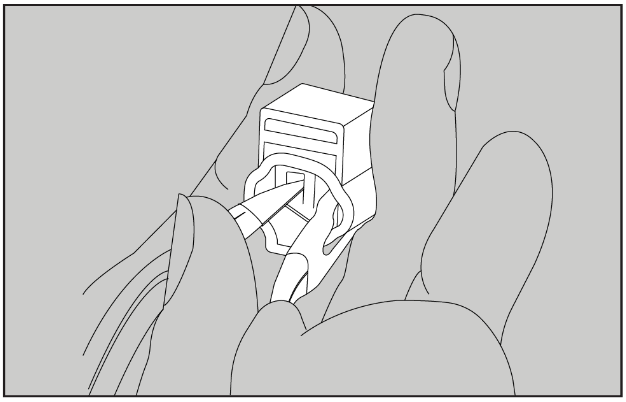

ON
OFF
PUSH
LOCK
IGNITION

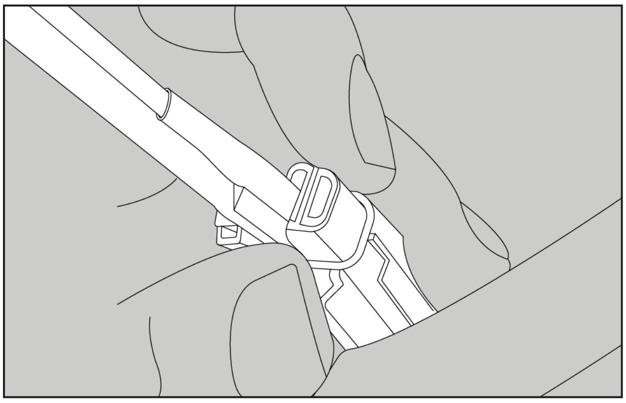

ROYAL ENFIELD
SINCE 1901

- Keep the multimeter in Voltage mode (20 V)

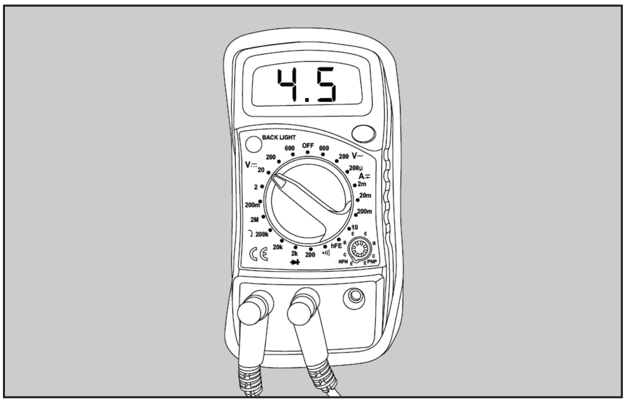

BACK LIGHT
OFF

- Connect the test lead wire 90 series (orange color) with the black tag in the sensor socket Pin 1 and other test lead wire 90 series (Orange Color) with the red tag in the sensor socket pin2, then connect the other end of the test lead wire in the sensor wiring harness

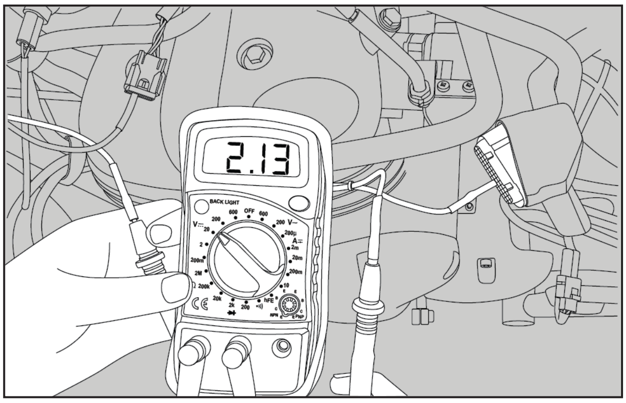




- Place the multimeter positive probe in pin 2 (red tag test lead wire) and negative probe in Pin 1 (black tag test lead wire). Start the engine and keep it in idle RPM
- Voltage should be between 3.1V to 4.87 V (-20 Deg C to 60 Deg C) (Condition: ambient temperature without engine warm-up)


4.5
BACK LIGHT
OFF

- Place the multimeter positive probe in pin 2 (red tag test lead wire) and negative probe in Pin 1 (black tag test lead wire). Voltage should be less than 2.25 V. (Condition: Engine warm-up for 3 mins at half throttle



⚠ CAUTION

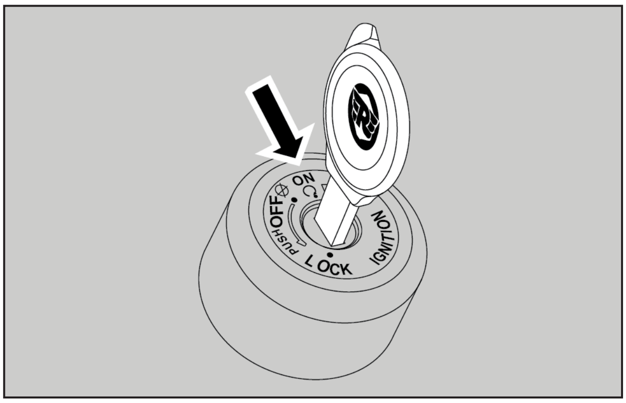
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

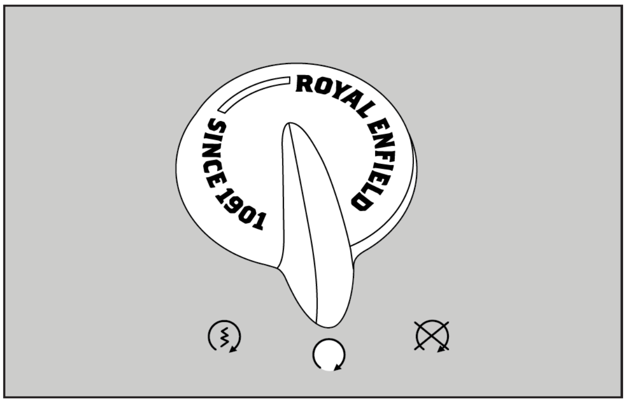
1.3.1. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0030 - LAMBDA SENSOR HEATER DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0030	Lambda Sensor Heater	Oxygen Sensor Heater Control Circuit Low / Open

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P0030

Type of error : Oxygen Sensor Heater Control Circuit Low / Open

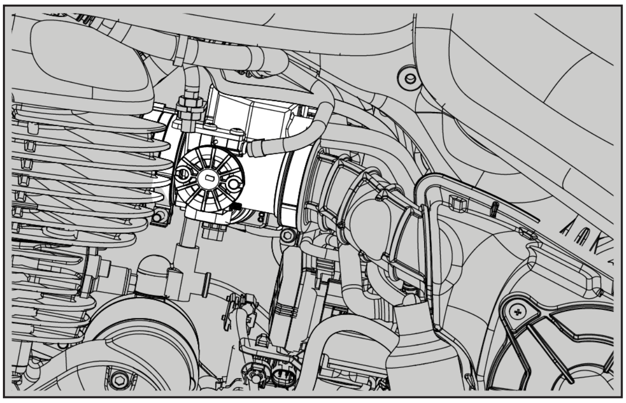
(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

b.Preliminary Checks (Basic Check Points):

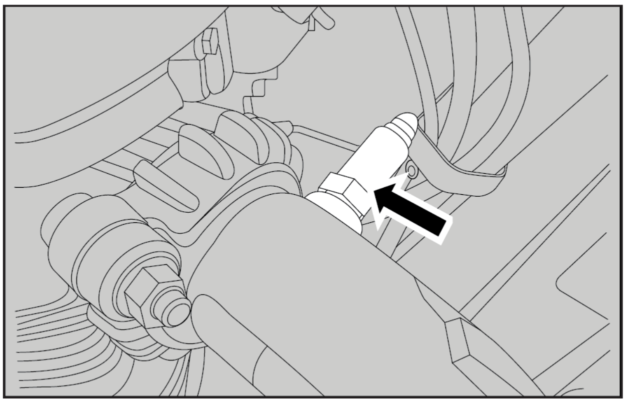
⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

⚠ **CAUTION**
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

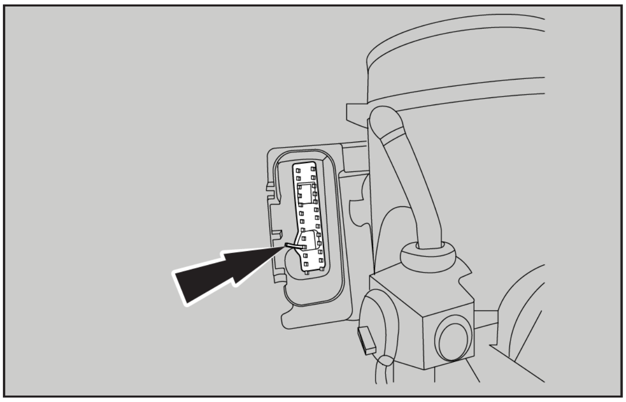
- ECU is located on the throttle body assembly



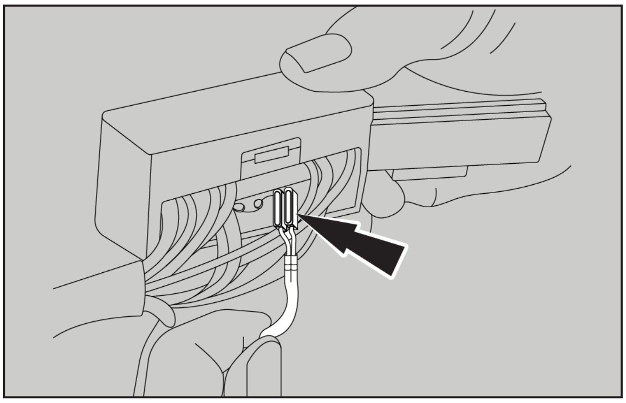
- The lambda sensor is located on the Exhaust pipe



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

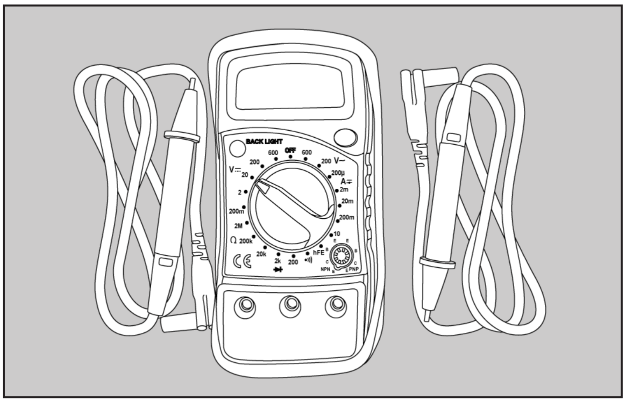
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

3.1 - Using Breakout Box method

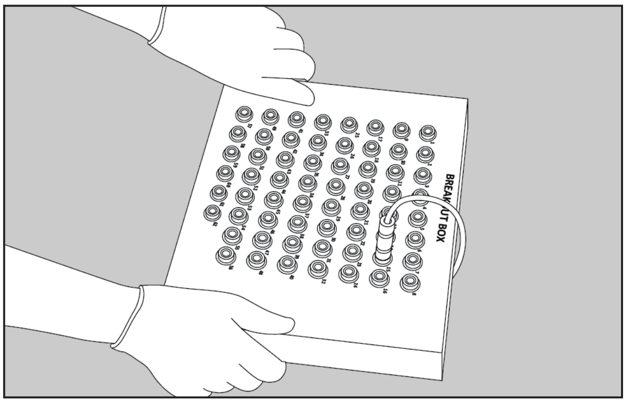
3.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

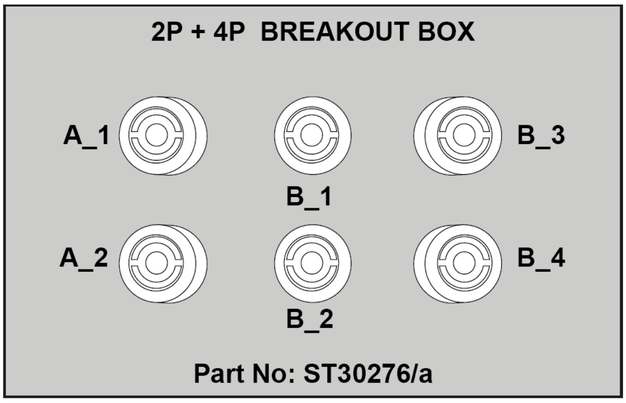
- **Tools Required**
- Multimeter (Universal)



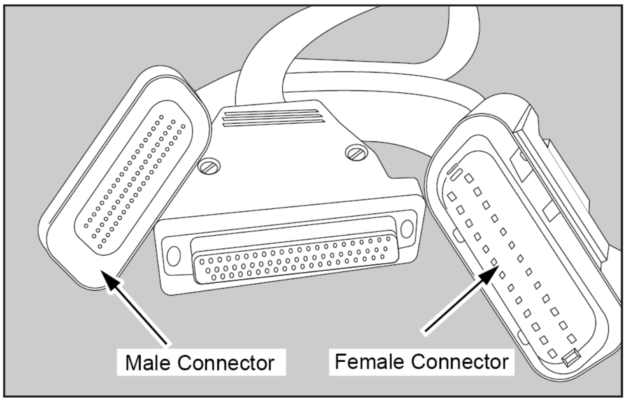
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

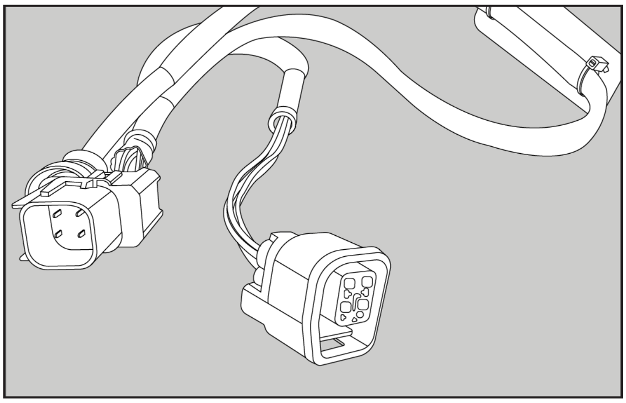
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

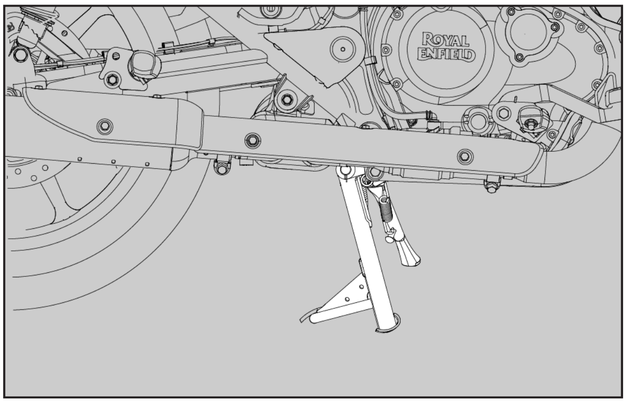

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

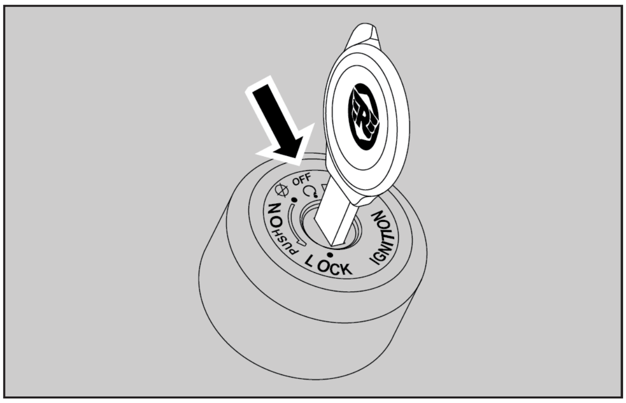


b. Pre-Checks:

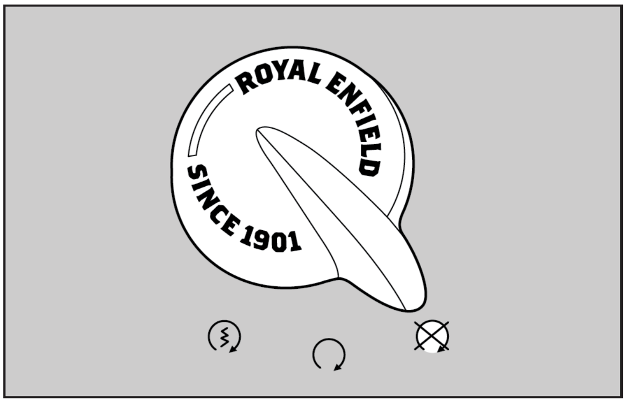
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition

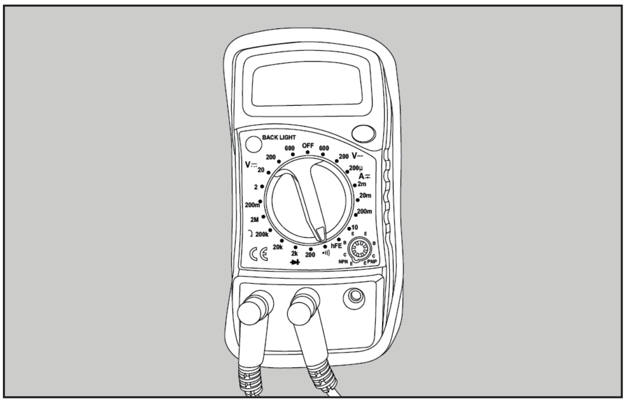

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

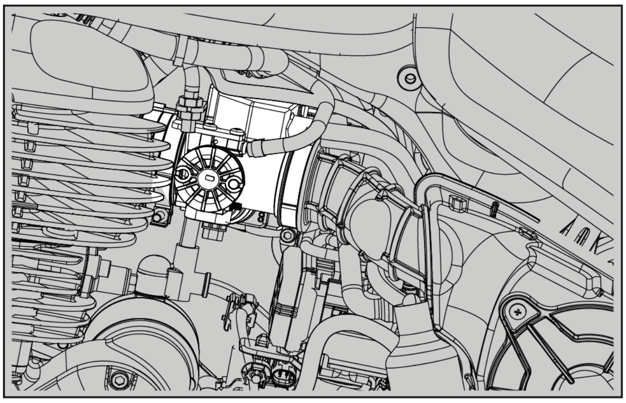
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

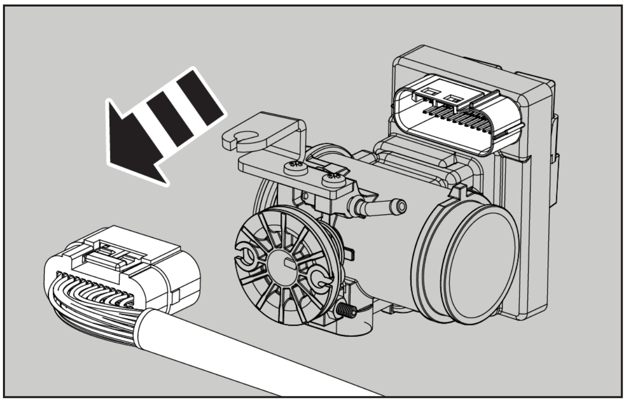
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

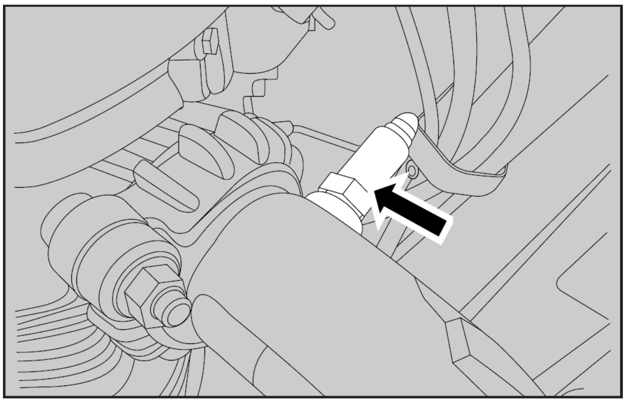
- ECU is located in the throttle body assembly



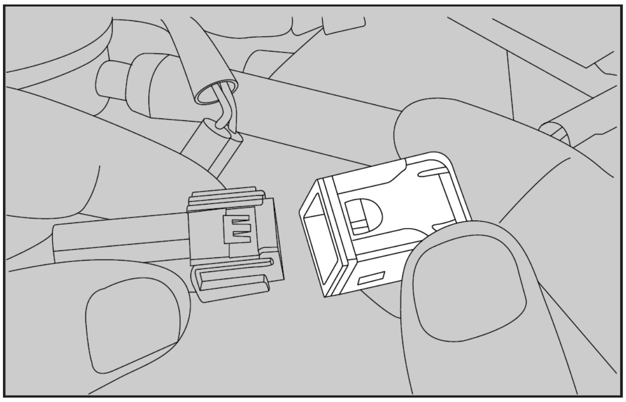
- Disconnect ECU coupler from ECU.



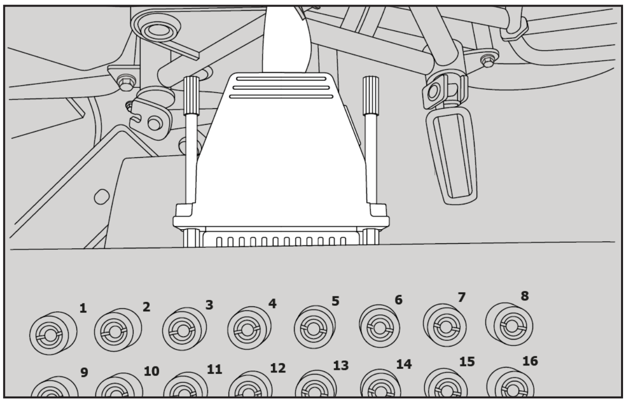
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



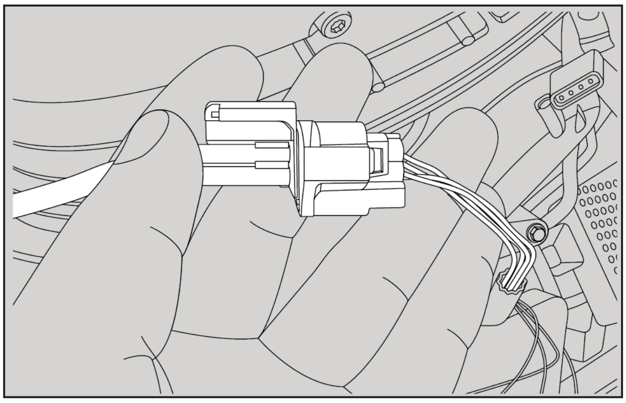
- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.

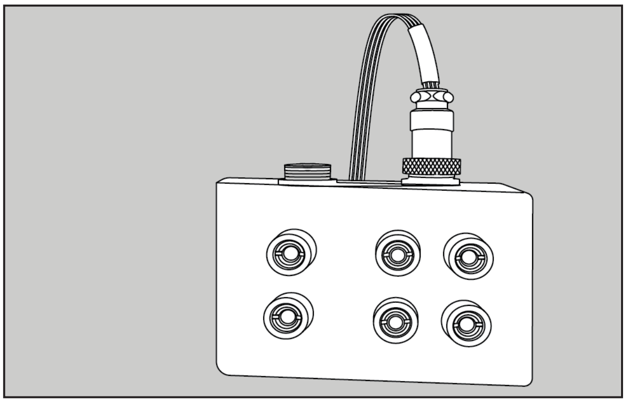


- Connect ECU Breakout box to ECU breakout box harness



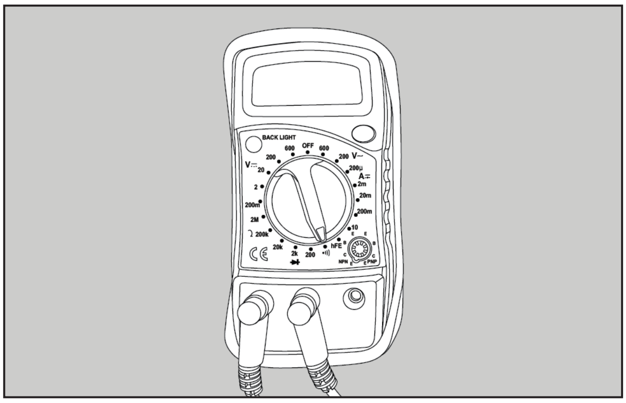
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



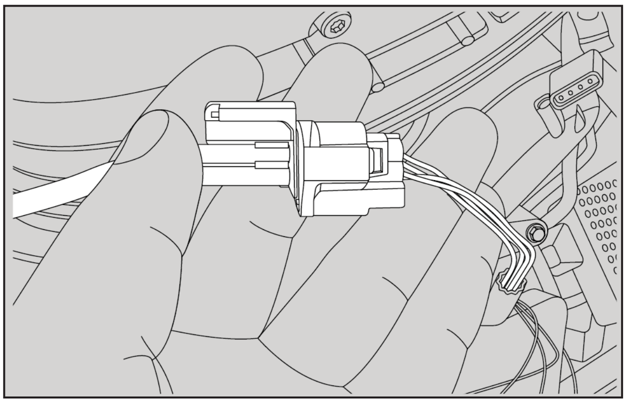


a. To check Continuity of Wiring harness

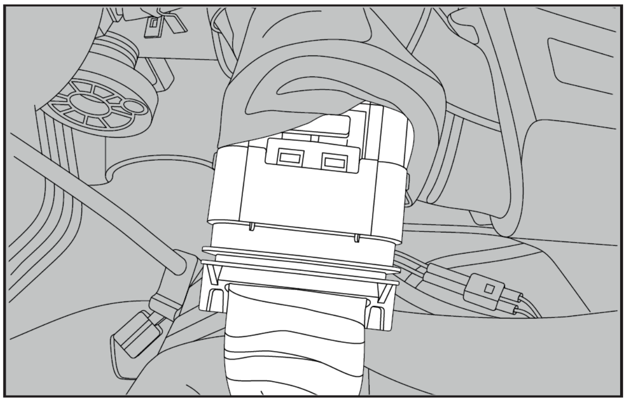
- Keep the multimeter in continuity mode



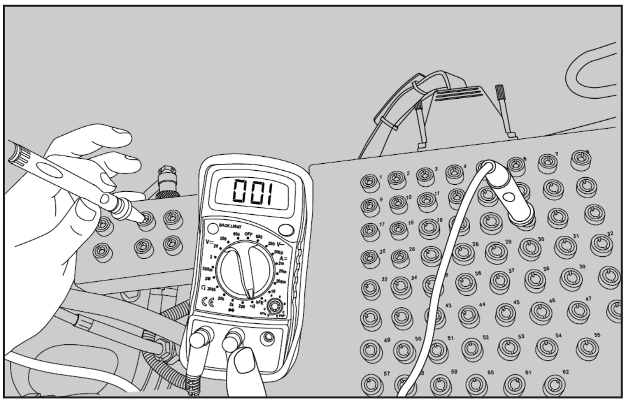
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



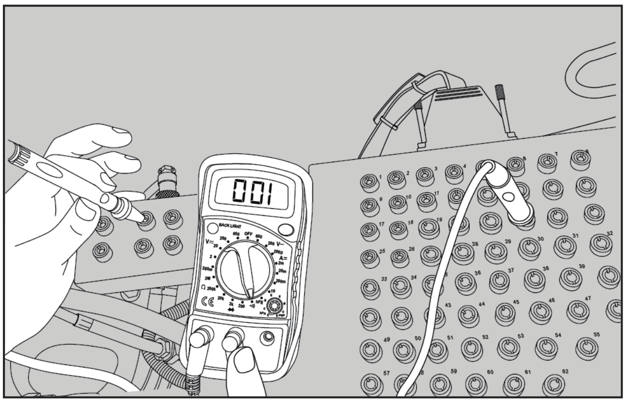
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



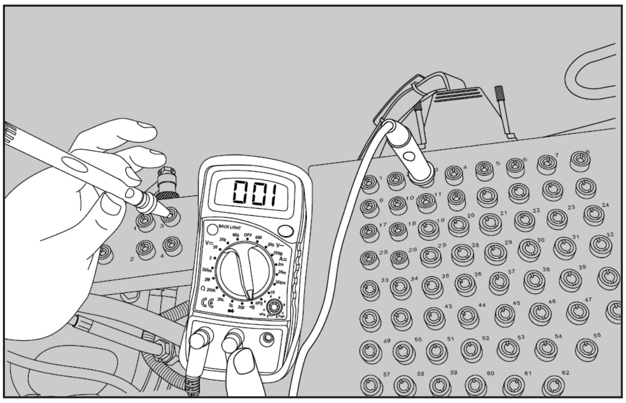
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



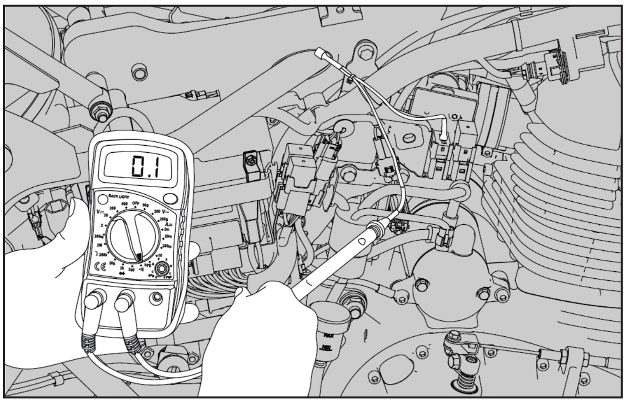
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

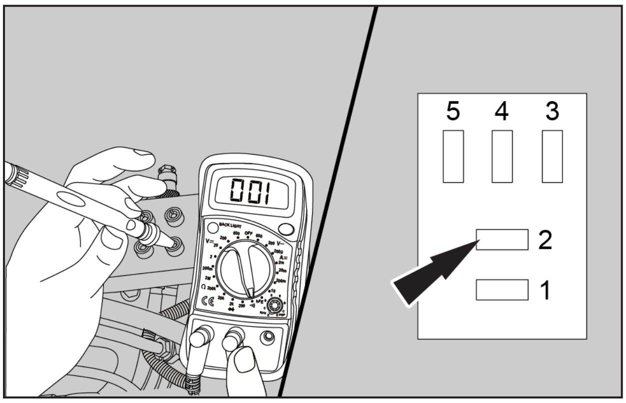


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



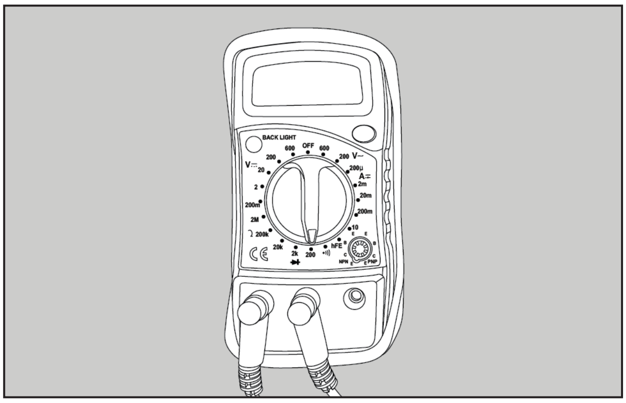
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



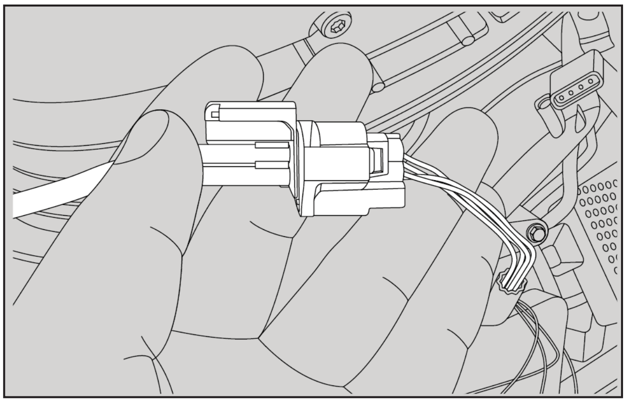


C. To check output voltage

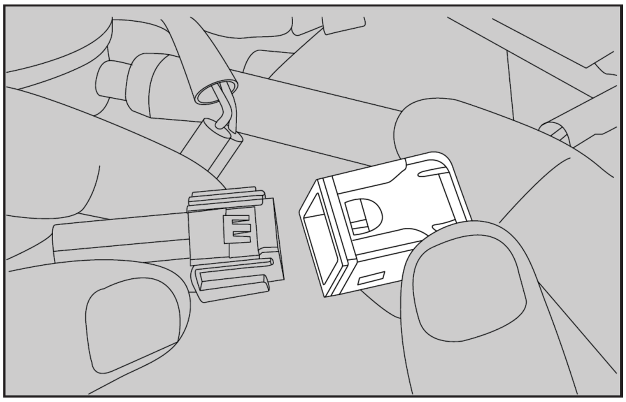
- Keep the multimeter in voltage mode (20V)


BACK LIGHT
600
OFF
600
200
200
V
20
A
2
2m
20m
200m
200m
2M
10
200k
20k
2k
200
hFE
NPN
PNP

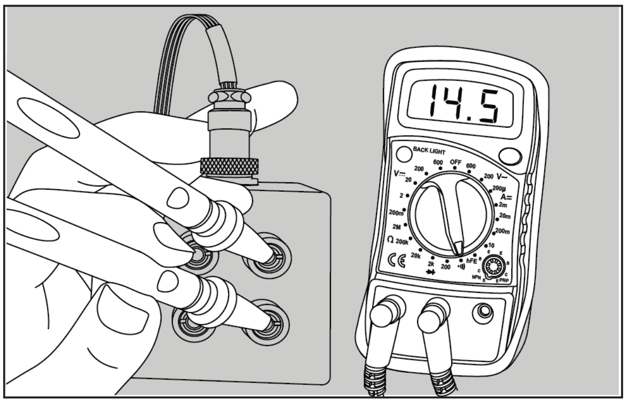
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

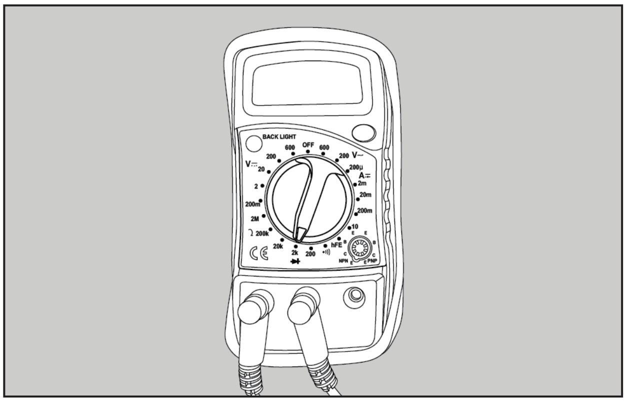


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

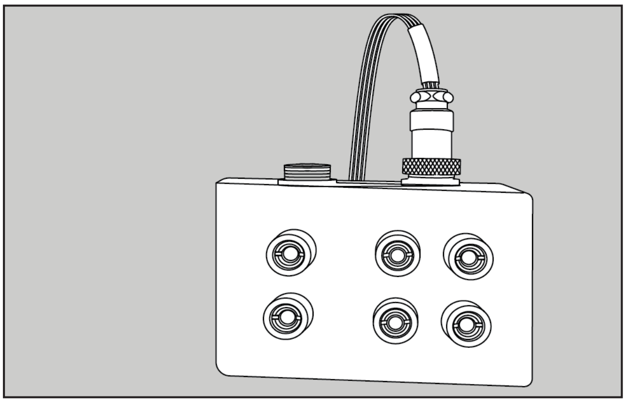

14.5
BACK LIGHT

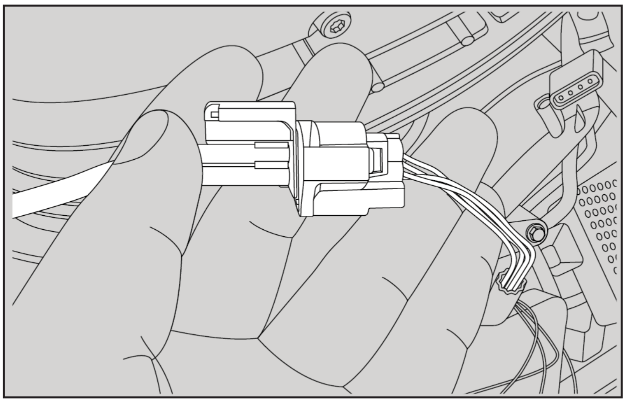
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

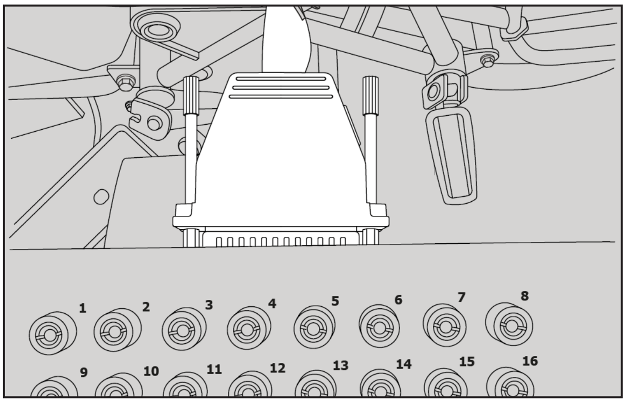


- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler





- Similarly, connect the ECU breakout box to ECU and wiring harness


1
2
3
4
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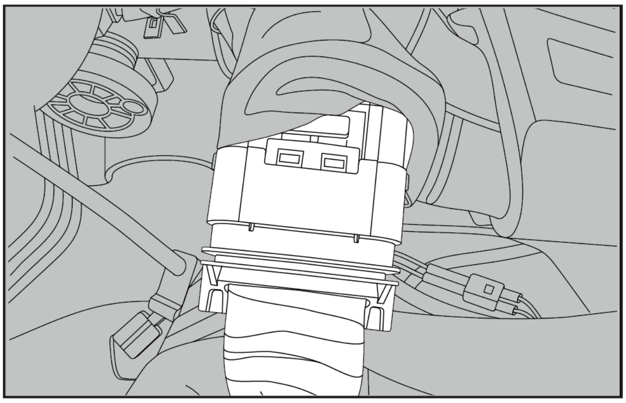
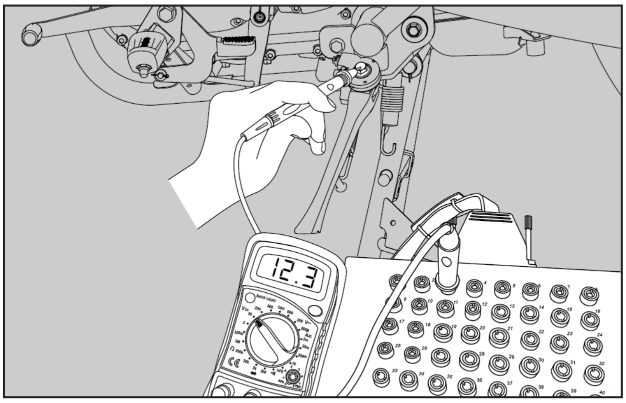
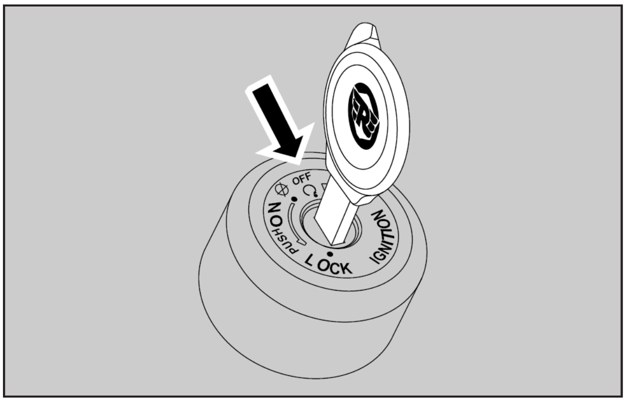
15
16

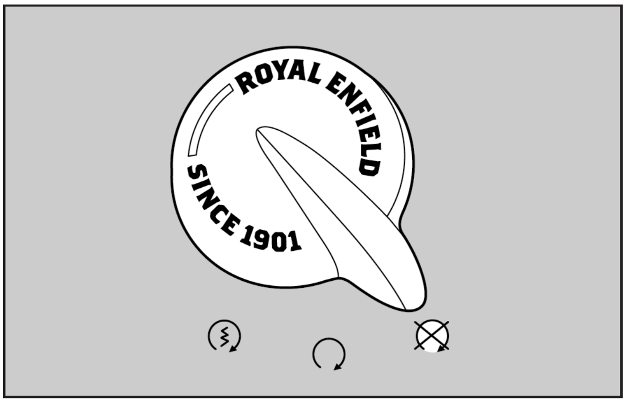


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

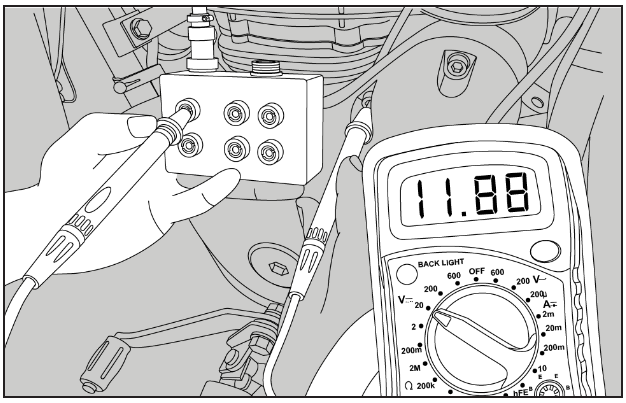


- Turn "ON" the ignition and kill switch


OFF
PUSH ON
LOCK
IGNITION

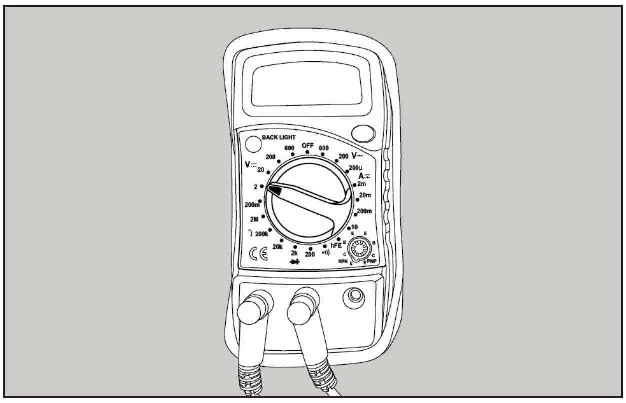

ROYAL ENFIELD
SINCE 1901

- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

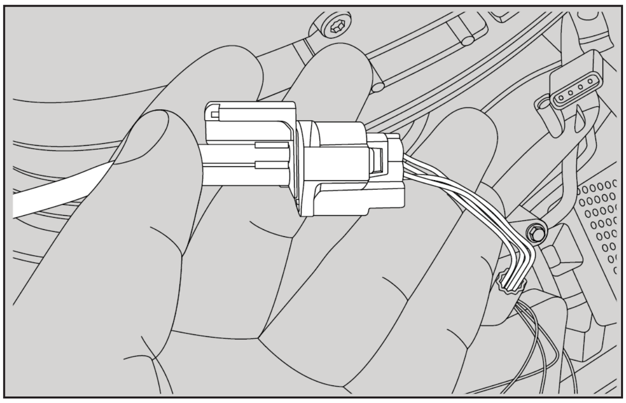


To Check output voltage check

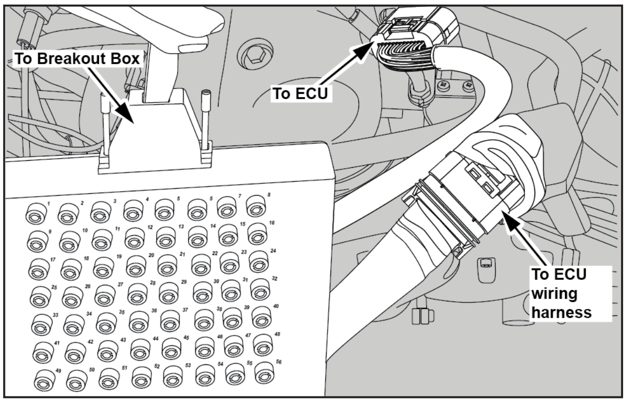
- Keep the multimeter in Voltage mode (2 V).



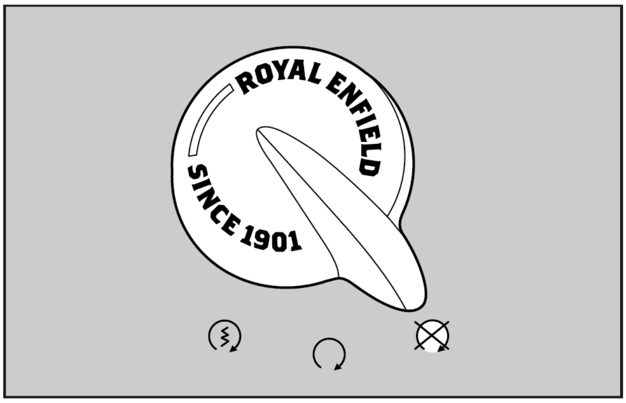
- Connect the female end of the Sensor breakout harness into the sensor coupler

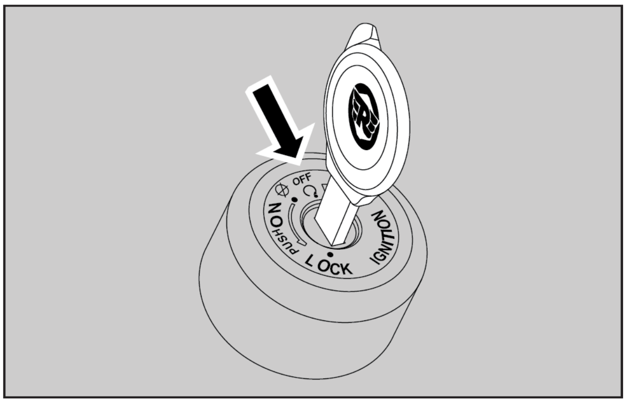


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn "ON" the kill switch and ignition switch

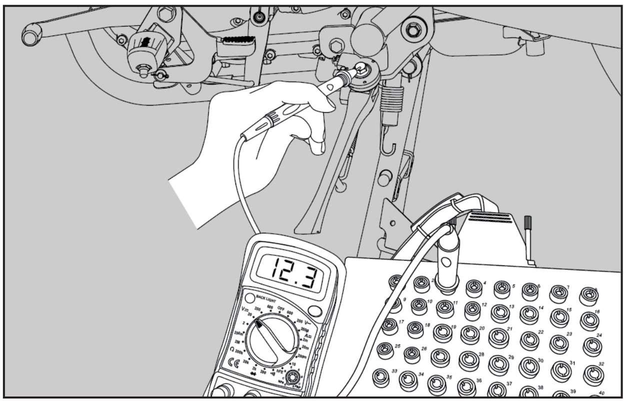

ROYAL ENFIELD
SINCE 1901


OFF
PUSH ON
LOCK
IGNITION

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

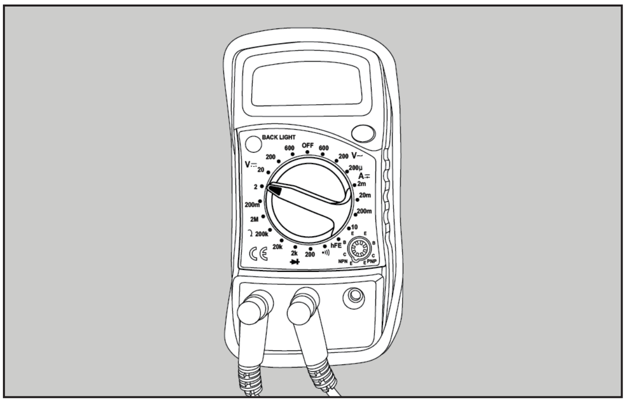
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



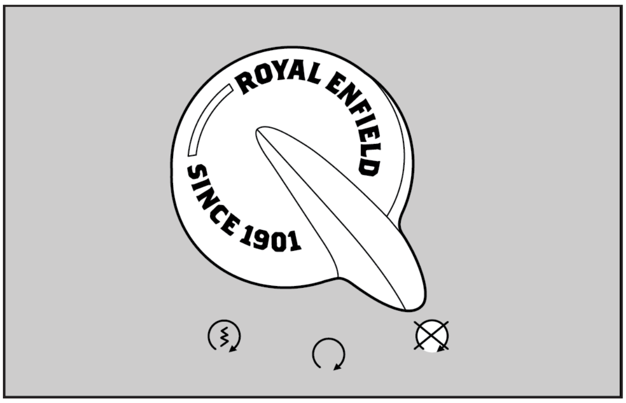
- Switch "OFF" the Engine

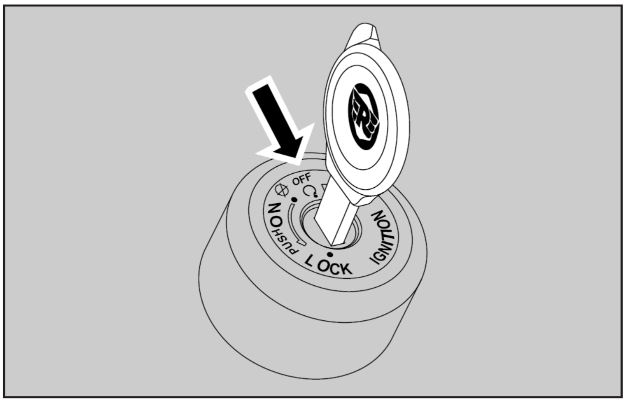
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

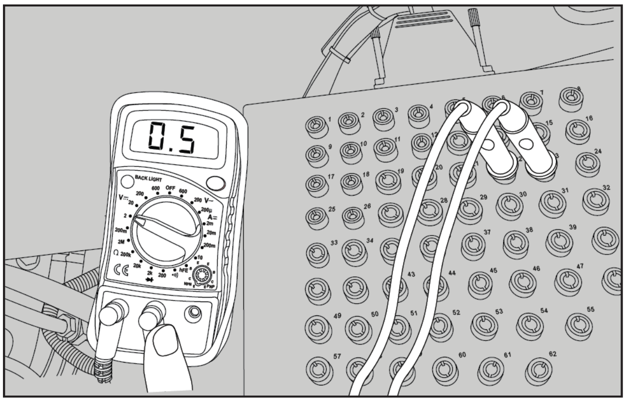


- Turn "ON" the Ignition switch and kill switch





- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU breakout box. It should be 0.4 V to 0.65 V



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the Heater output voltage is 0V (After 10 sec from engine start) then the issue exists in either Sensor heater or ECU
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), you replace with Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) you have to replace the ECU.

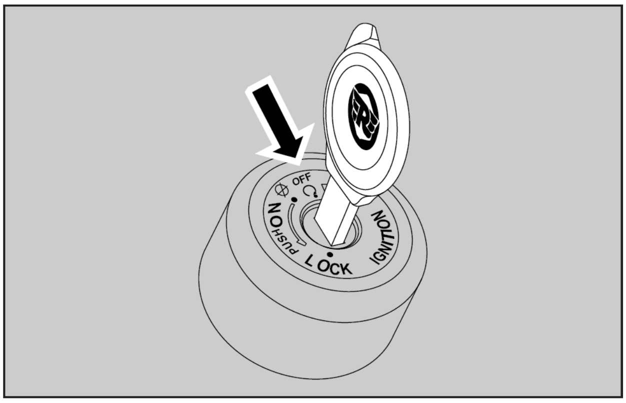
It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

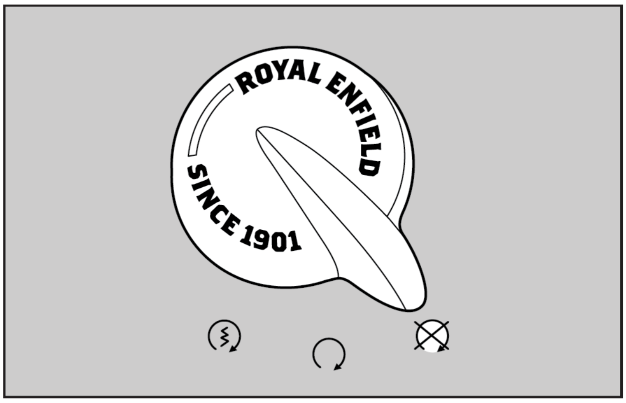
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

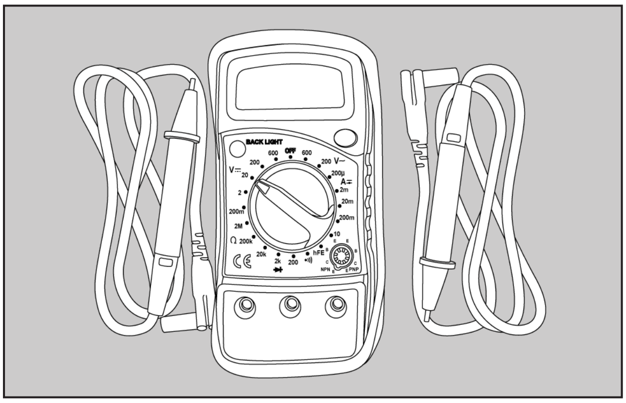
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)



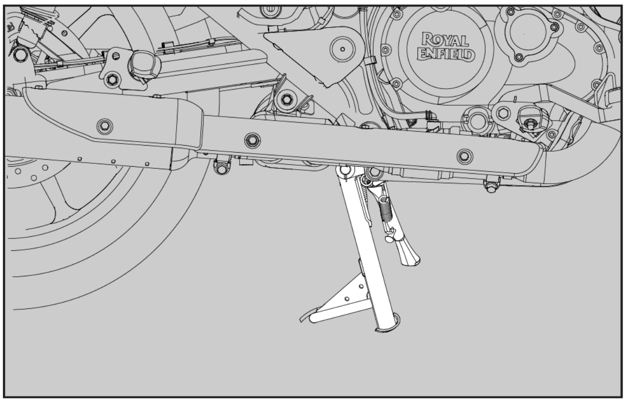
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

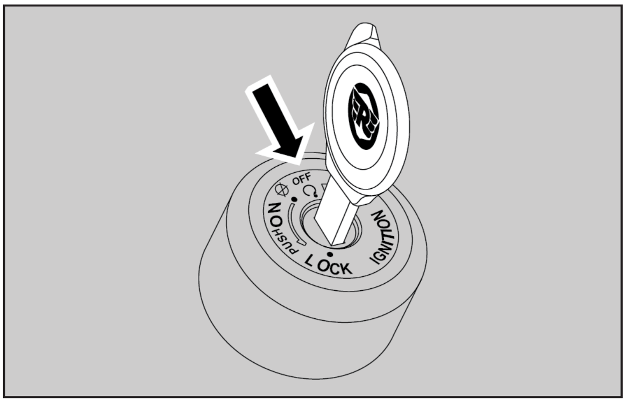
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

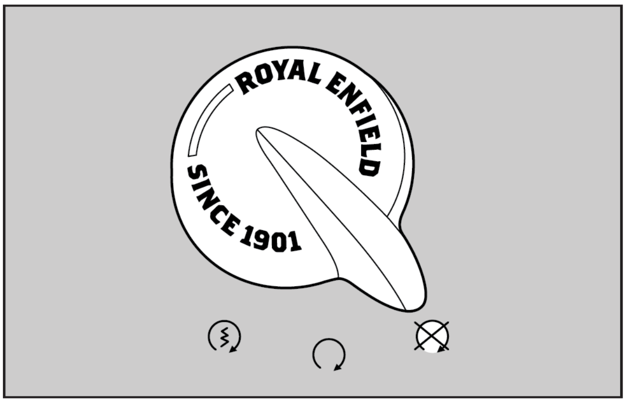
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

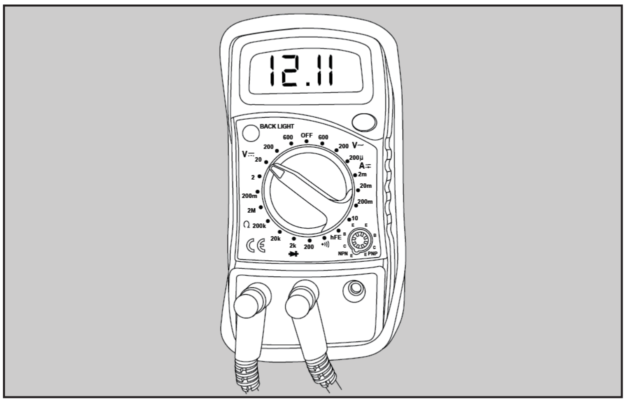


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

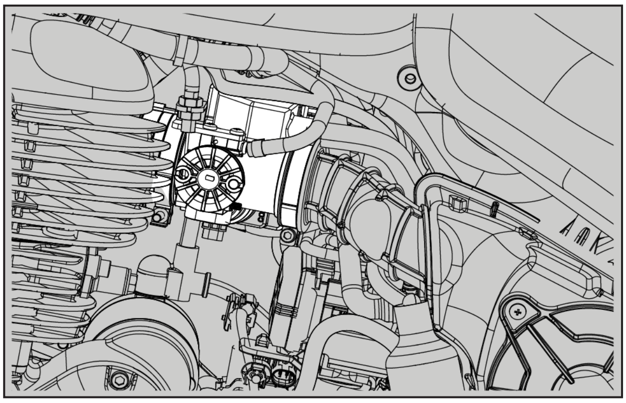
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/oxygen sensor coupler*

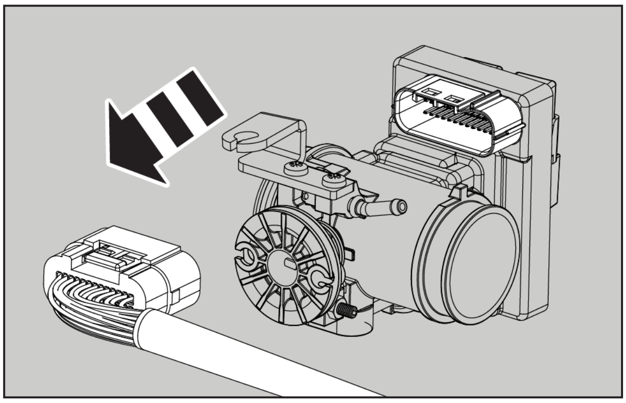
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

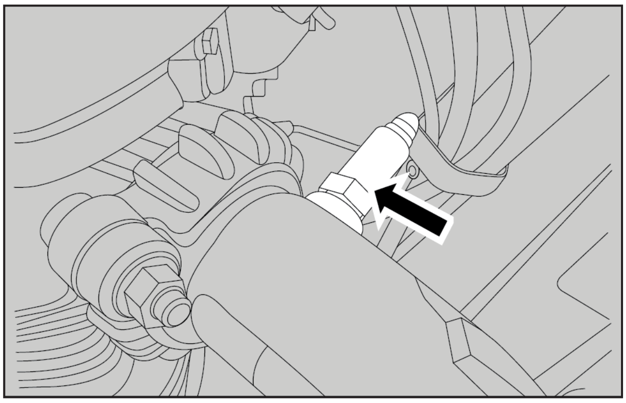
- ECU is located on the Throttle body assembly



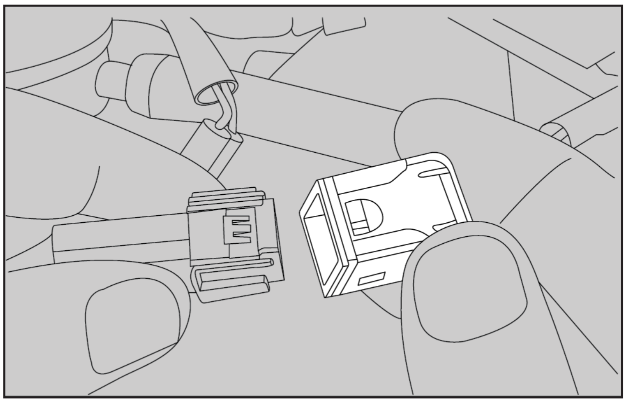
- Disconnect the ECU wiring harness coupler from ECU



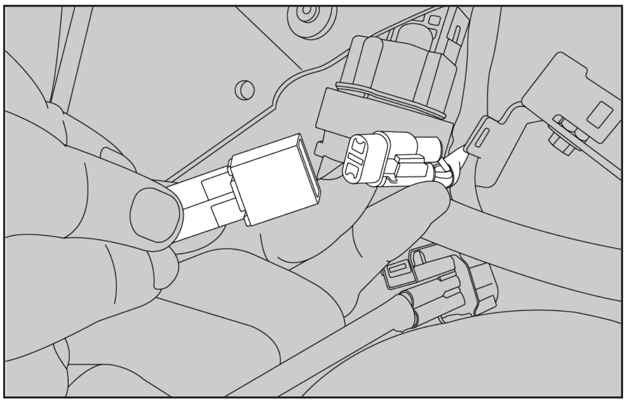
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe

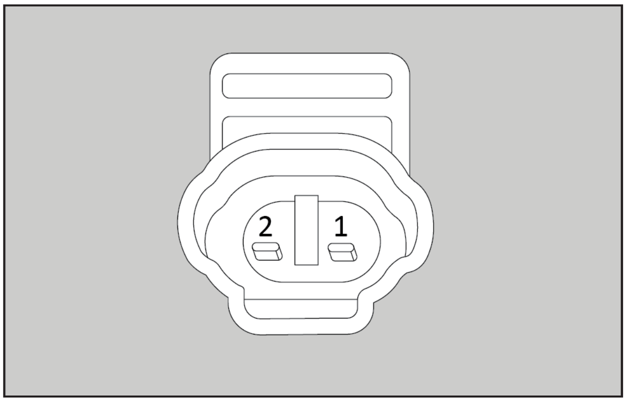


- Disconnect the oxygen sensor coupler.



- Disconnect the Engine oil temperature sensor Coupler

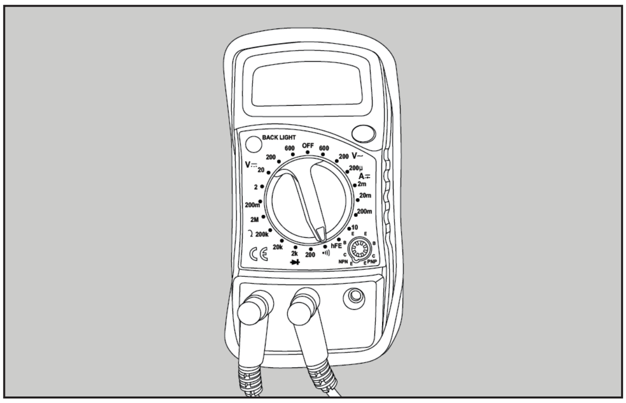




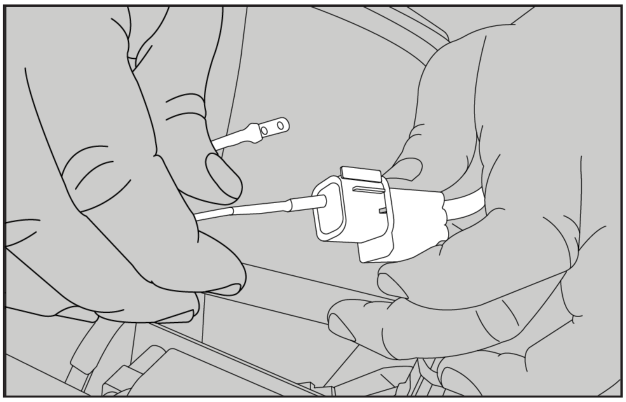
To check Continuity of the Wiring Harness

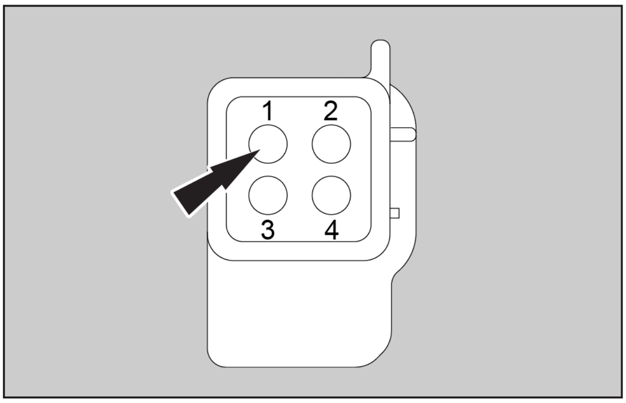
STEP 1:

- Keep the multimeter in continuity mode

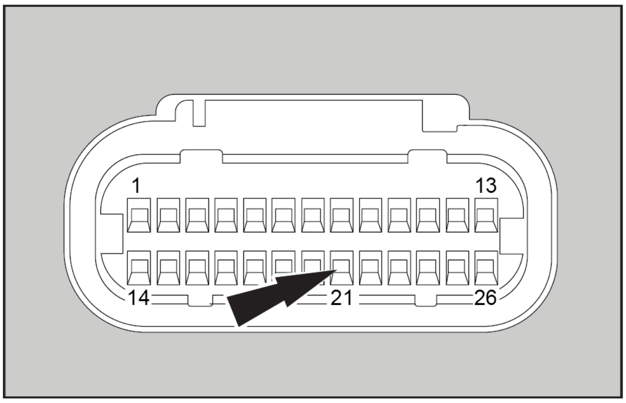


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

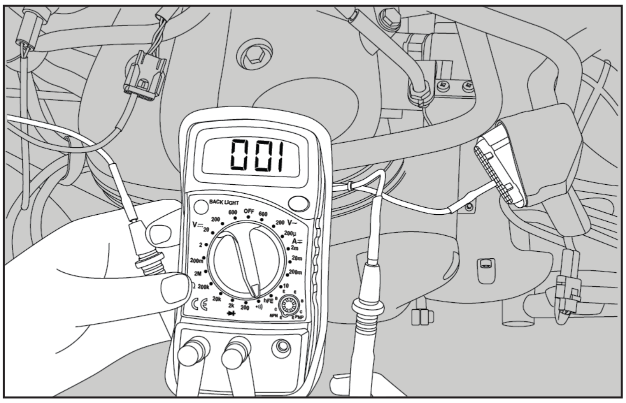




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

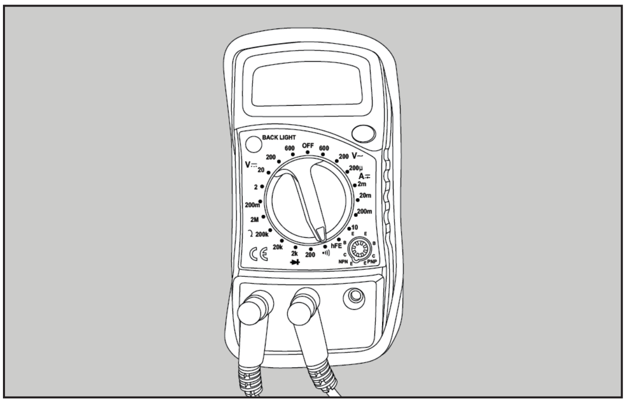


- Check for continuity (Beep Sound from the multimeter)

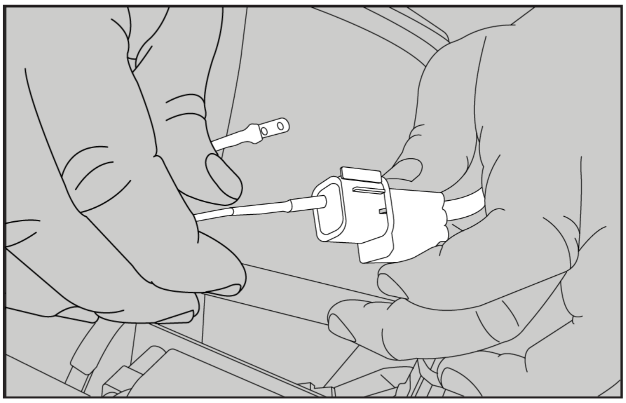


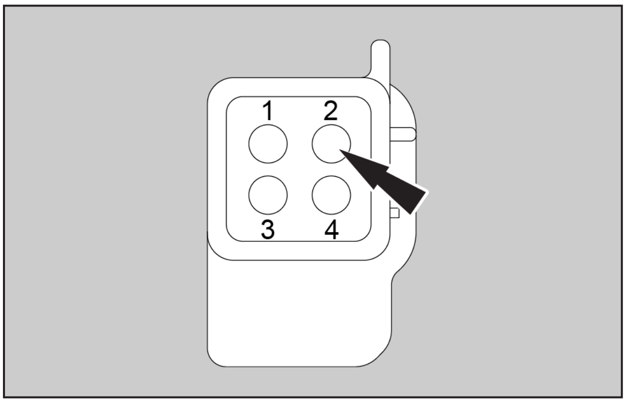
STEP2:

- Keep the multimeter in continuity mode

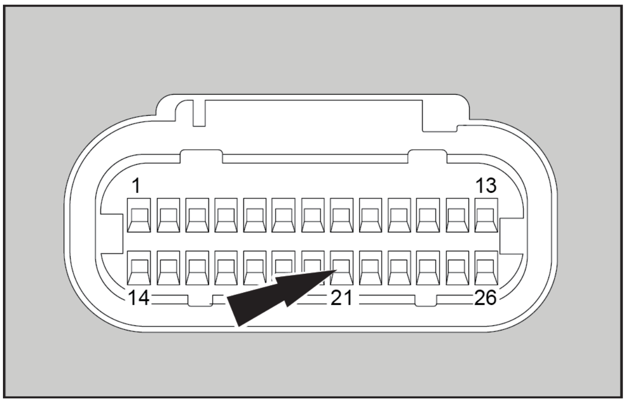


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 3 of the wiring socket.

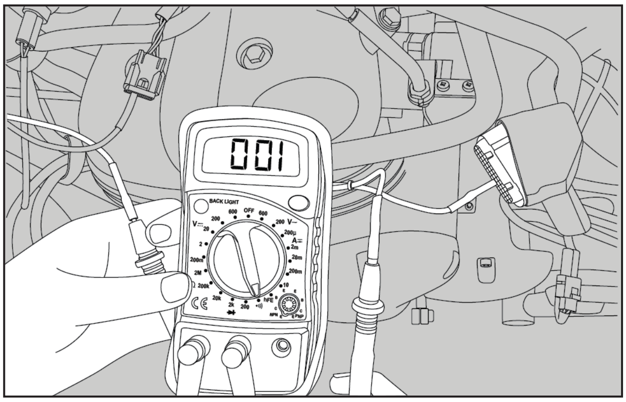




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

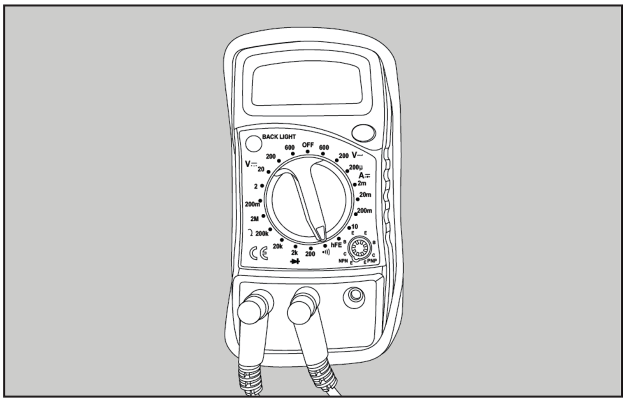


- Check for continuity (Beep Sound) from the multimeter

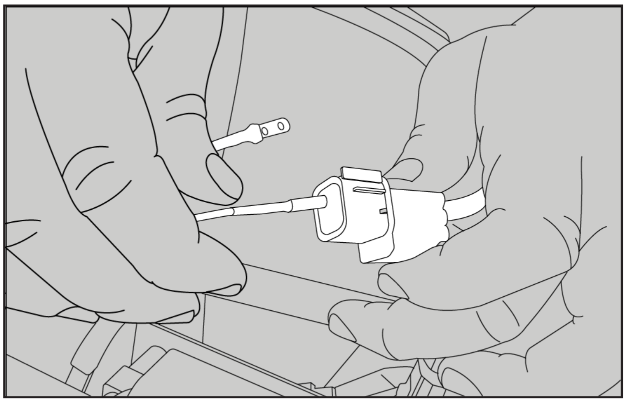


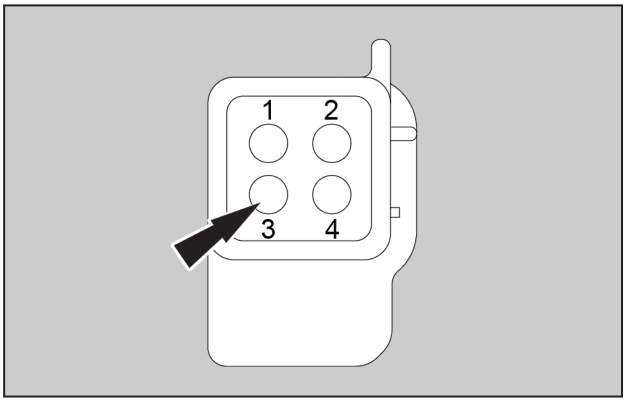
STEP 3:

- Keep the multimeter in continuity mode

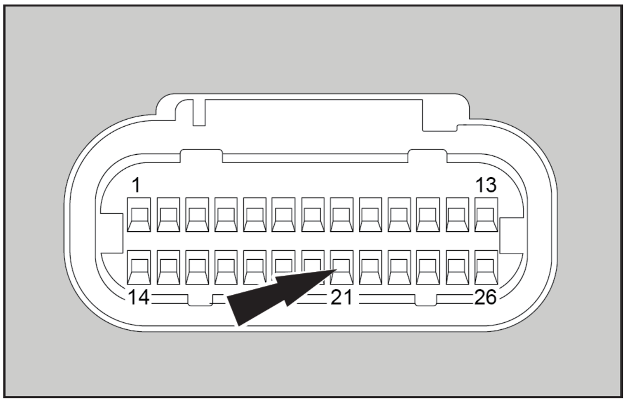


- Connect Test lead wire 60 series (blue color) with the yellow tag to Pin 3 of the wiring socket.

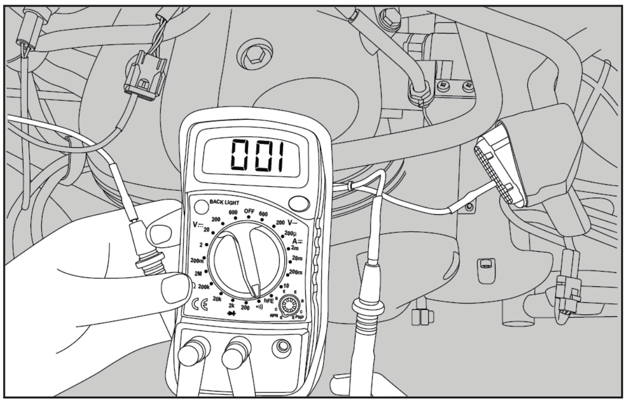




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

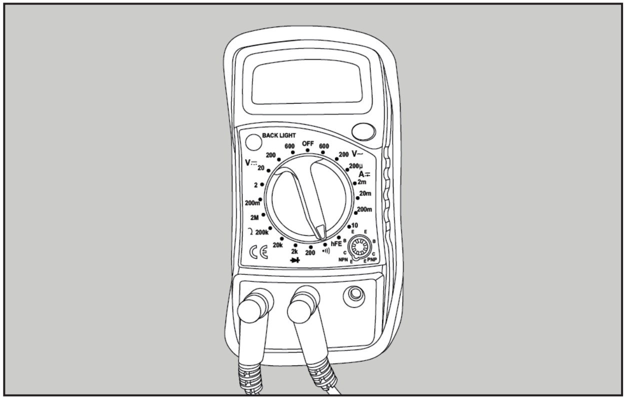


- Check for continuity (Beep Sound) from the multimeter

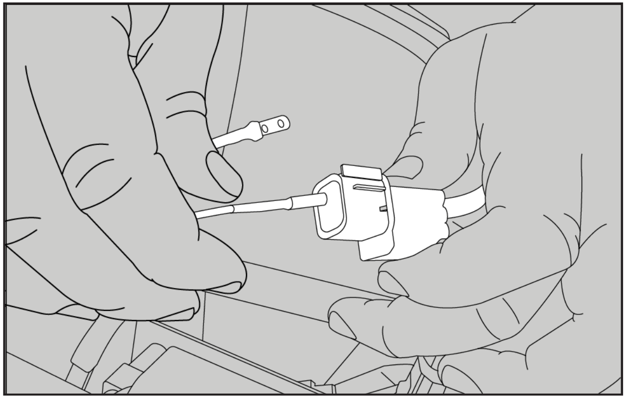


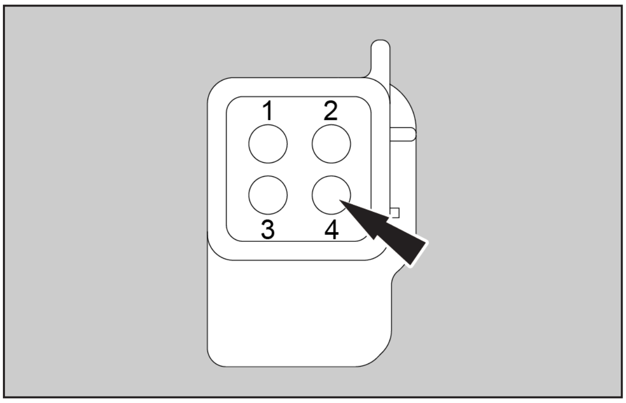
STEP 4:

- Keep the multimeter in continuity mode

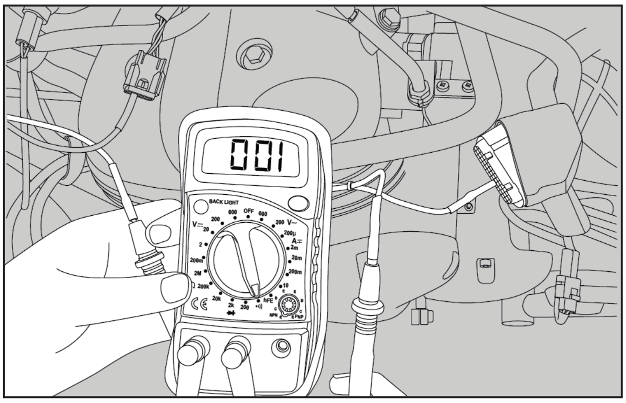


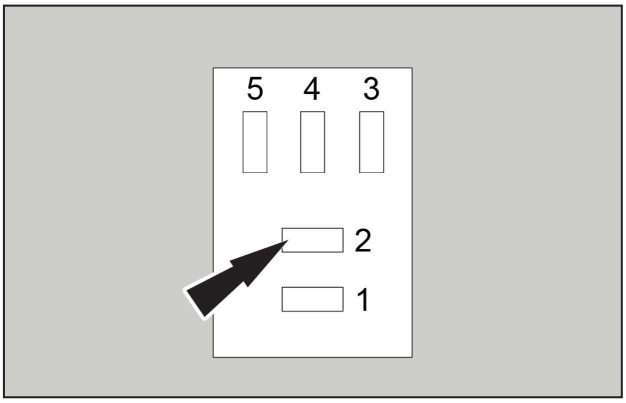
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



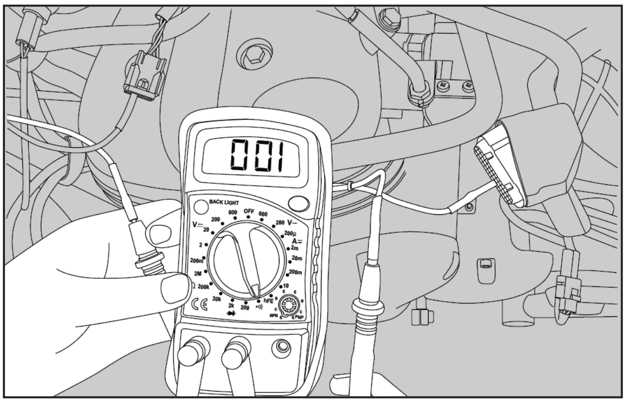


- Disconnect power relay and connect test lead wire into relay socket pin 2.





- Check for continuity (Beep Sound) from the multimeter

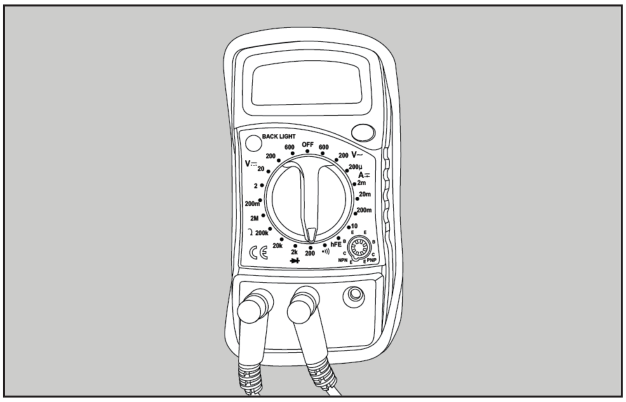


⚠ CAUTION

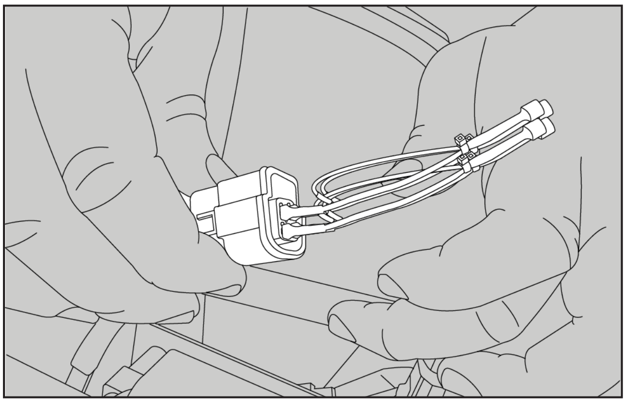
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the resistance of the sensor

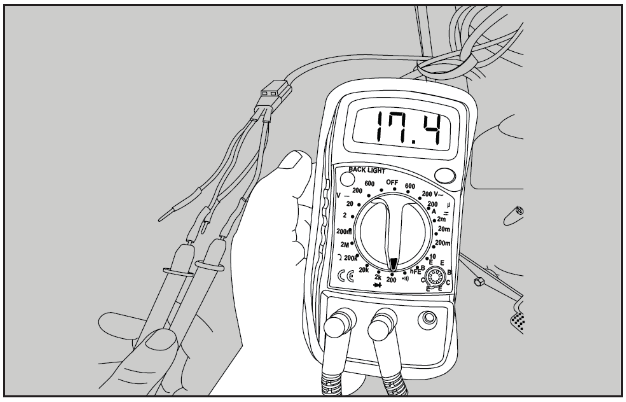
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



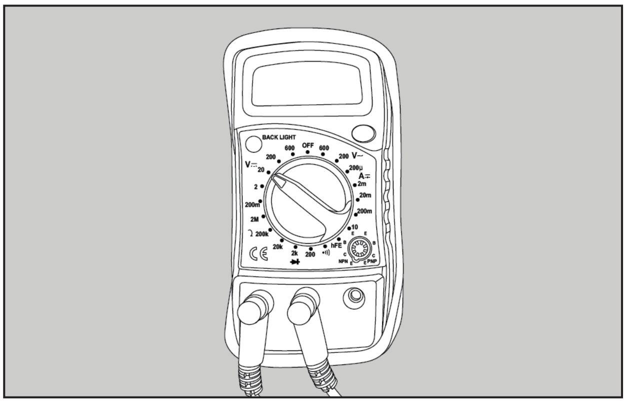
- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C



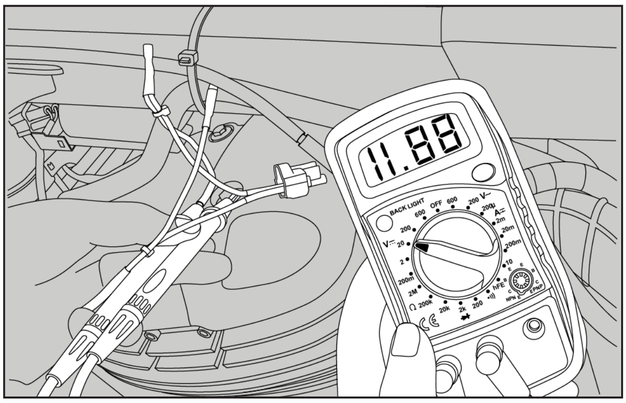
⚠ CAUTION
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



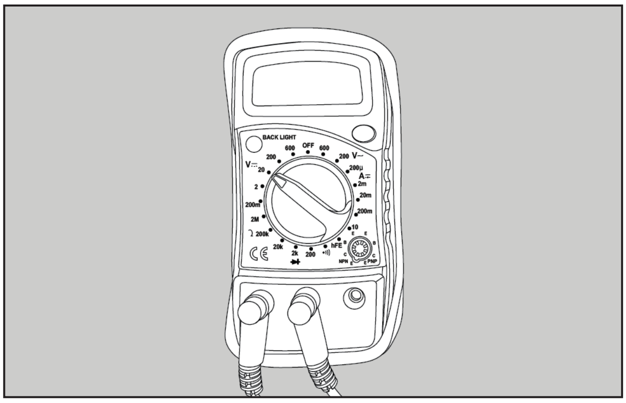
- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn “ON” the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)



⚠ CAUTION
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



d. Decision Point:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13 to17.5 Ohms @ 30 5 °C), you replace with Lambda/Oxygen Sensor
- If the voltage is not meeting the specified limit (0.4 V to 0.55 V)and (0.1V to 0.8 V at idling) and if continuity is available you have to replace the ECU.

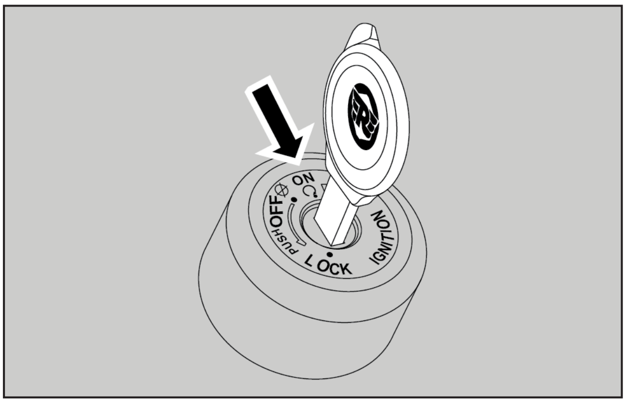
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

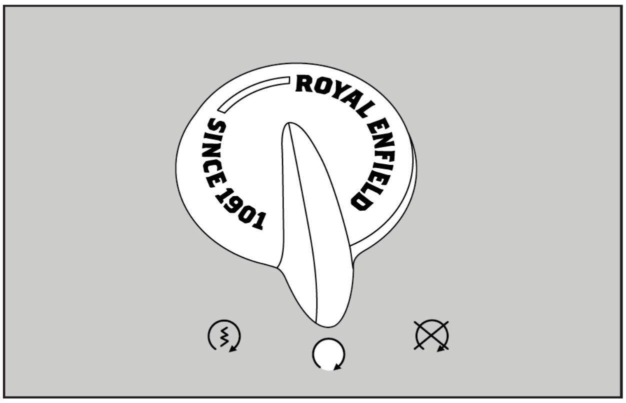
1.3.1. To check the Output voltage

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0261 - INJECTOR VALVE
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. LIST OF DTC CODES (P CODES)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0261	Fuel Injector / Injector valve	Cylinder 1 Injector Circuit Low / Open

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Fuel injector is also called as Injector valve

TROUBLE CODE : DTC CODE: P0261

Type of error : Cylinder 1 injector Circuit Low / Open

(i) Information : Injector valve circuit fault / Injector valve internal fault

b.Preliminary Checks (Basic Check Points):

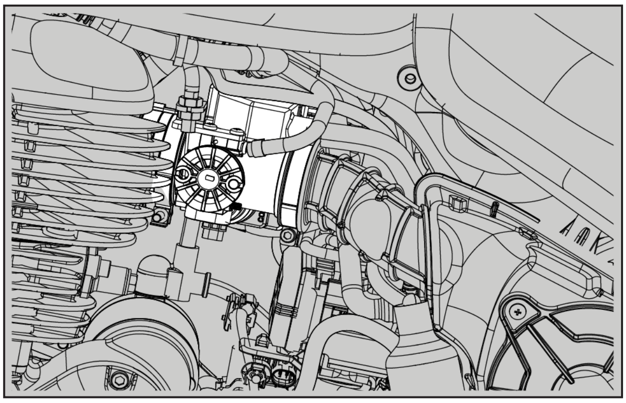
⚠ WARNING

Fuel Injector creates high pressure jets which can cause injury if exposed to the human body and also will cause damage to the painted surface

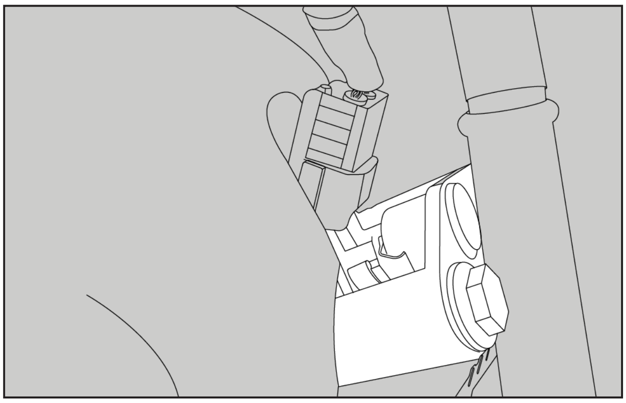
⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

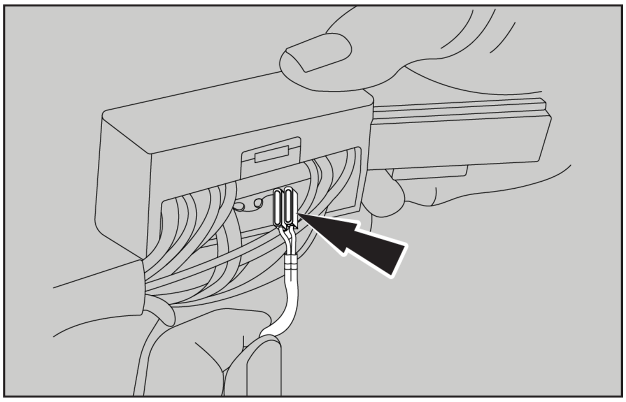
- ECU is located on the throttle body assembly



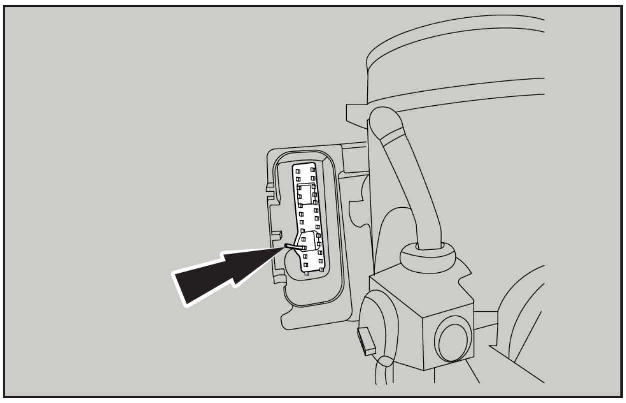
- The Injector is located on the intake manifold



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again.



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

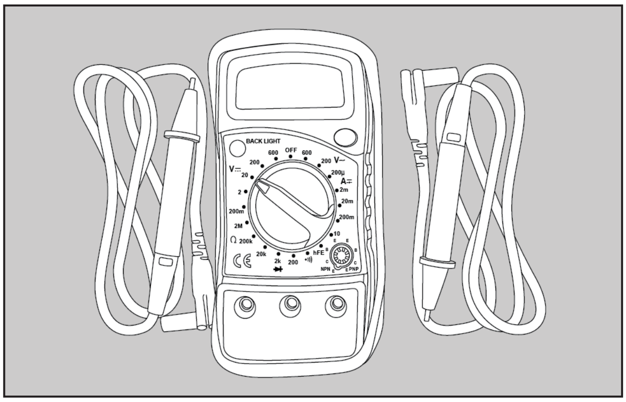
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

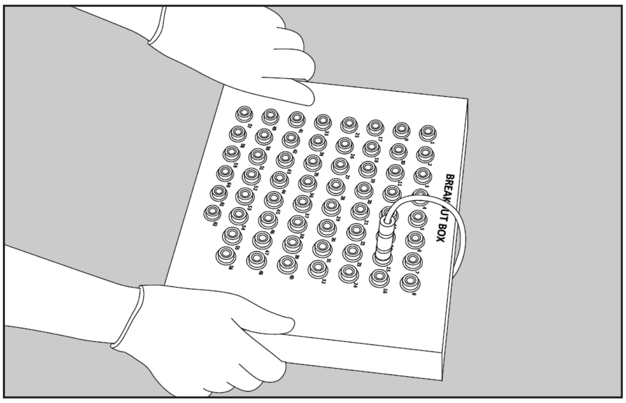
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

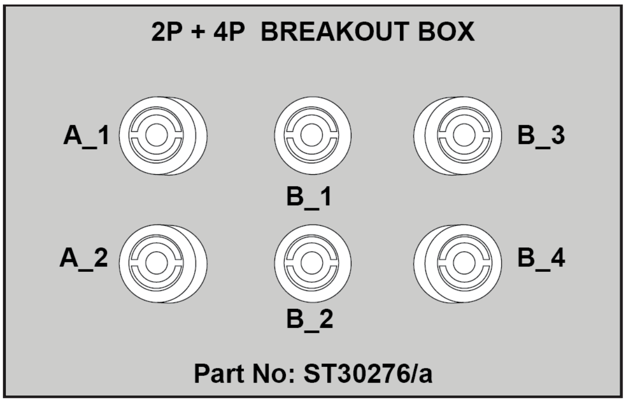
- **Tools Required**
- Multimeter (Universal)



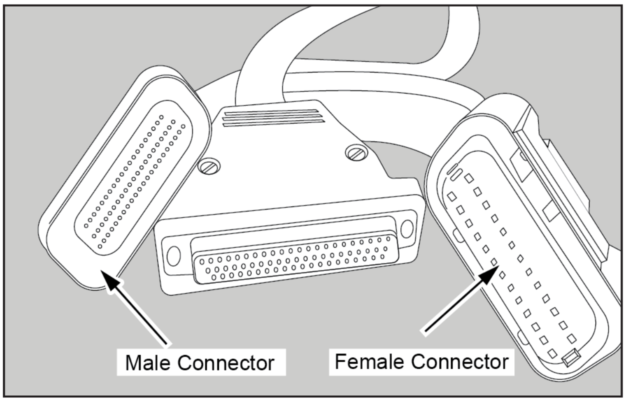
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

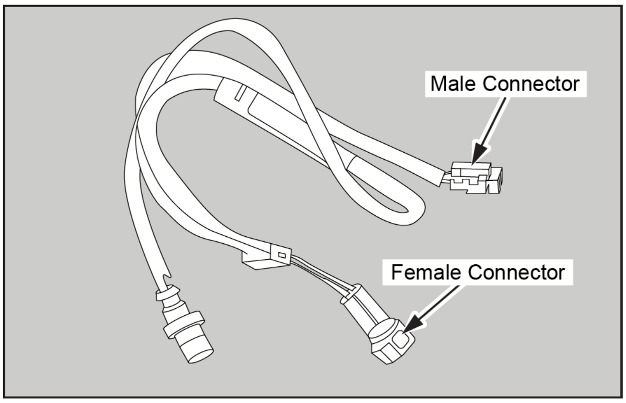
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

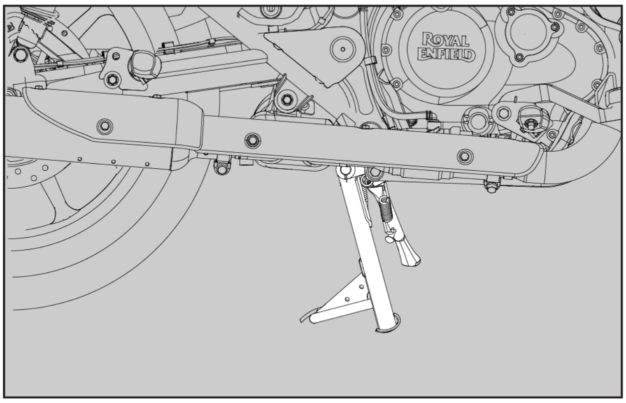

Male Connector
Female Connector

- Injector -2 Pin ST 30278/A -Sensor breakout box harness

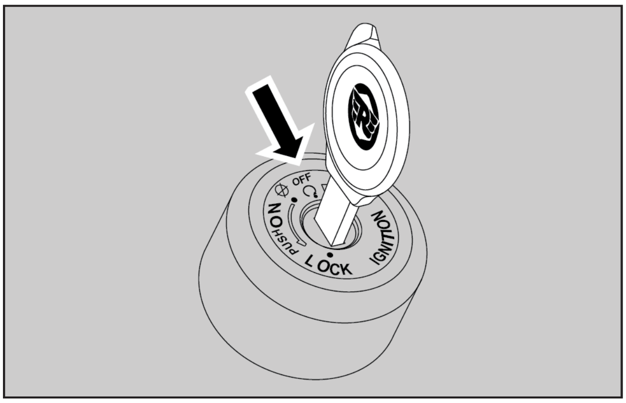

Male Connector
Female Connector

b. Pre-Checks:

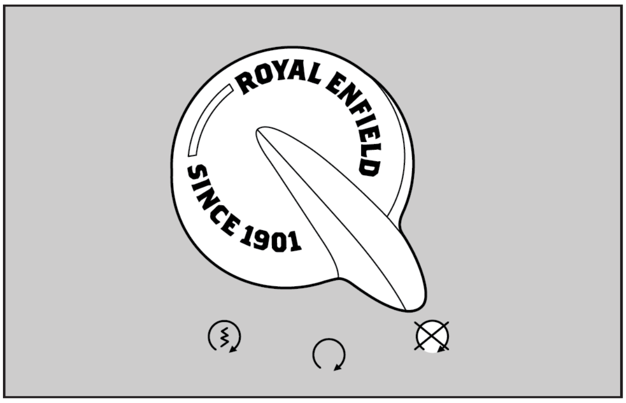
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)
- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

Fuel Injector creates high pressure jets which can cause injury if exposed to the human body and also will cause damage to the painted surface

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

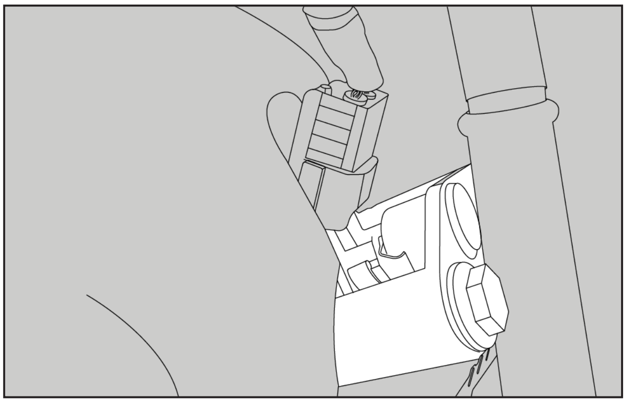
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Injector valve coupler*

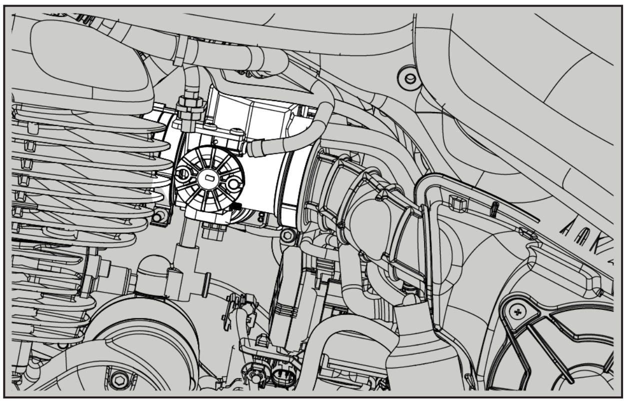
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

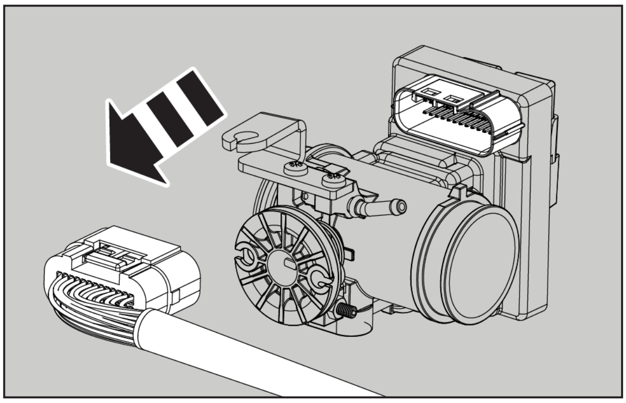
- Injector valve is located on the intake manifold



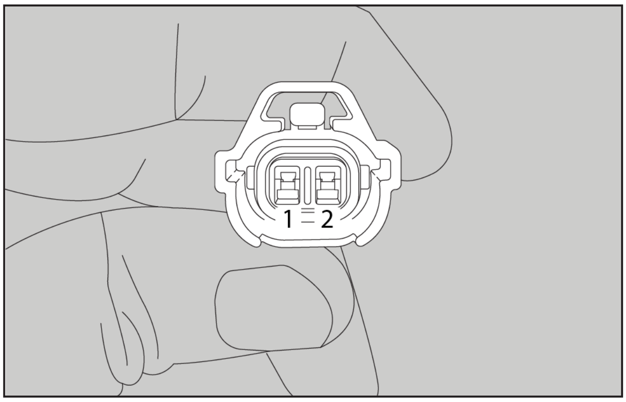
- ECU is located on the throttle assembly



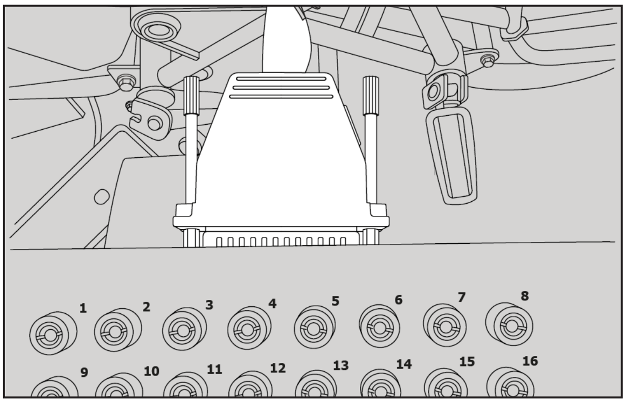
- Disconnect ECU from ECU coupler.

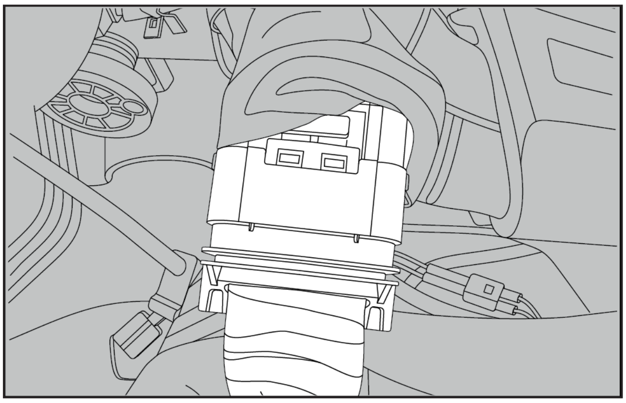


- Disconnect Injector valve coupler .

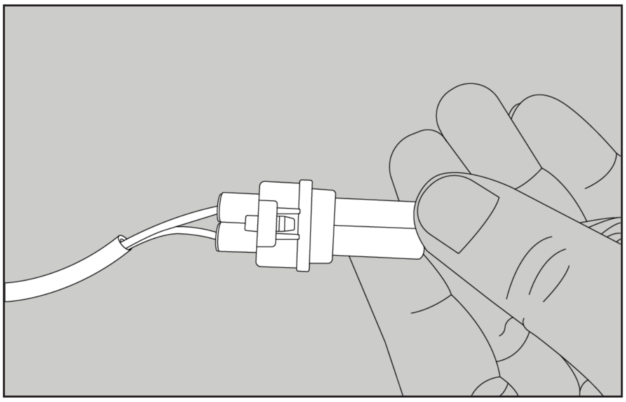


- Connect ECU breakout box harness to ECU breakout box (62 pin)



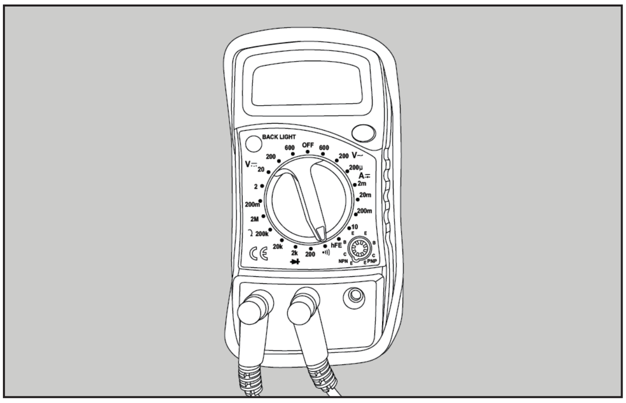


- Connect injector breakout box harness to sensor Breakout Box (2P+4P Pin)

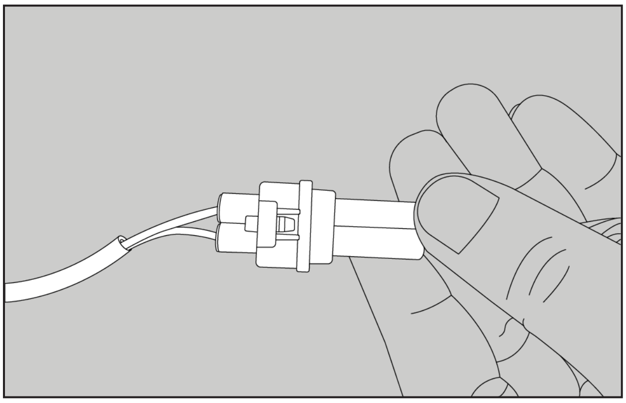


a. To check Continuity of Wiring harness

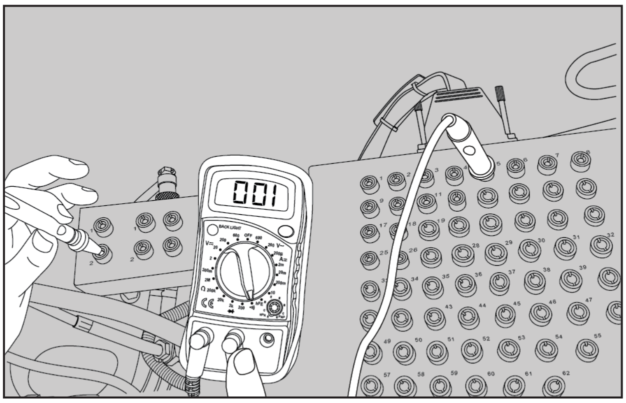
- Keep the multimeter in continuity mode



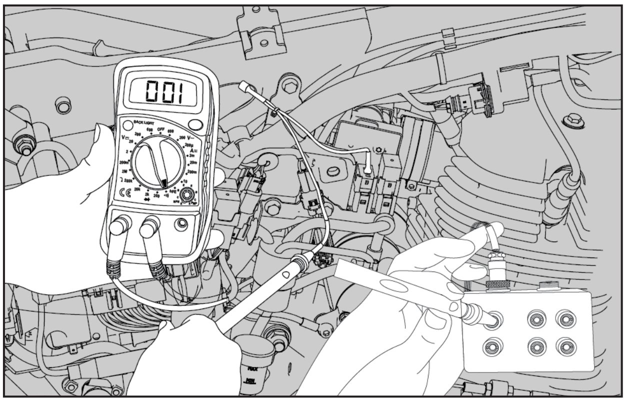
- Connect the injector breakout box harness to injector wiring harness coupler



- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 5 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

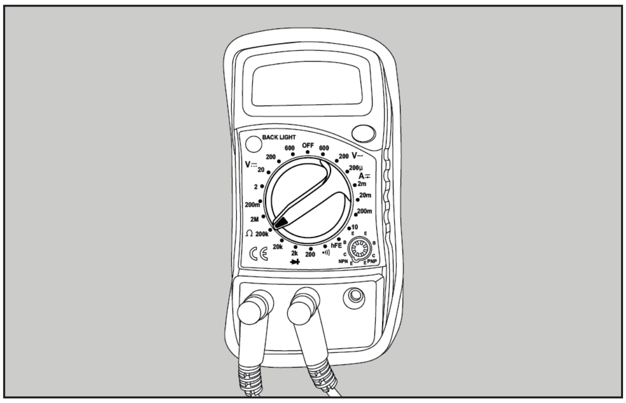


- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in pin 2 of the power relay. Check for continuity (Beep sound from the multimeter)

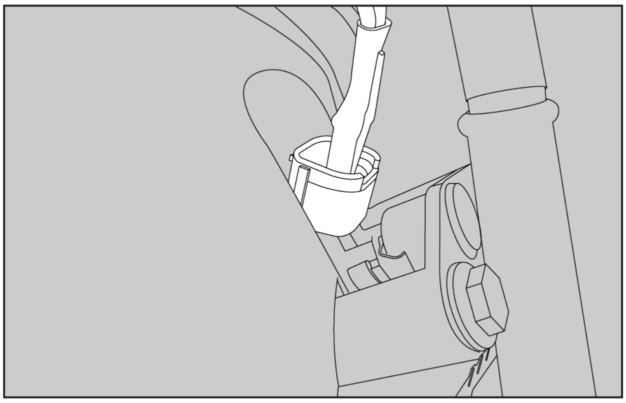


To Check Resistance of Injector valve

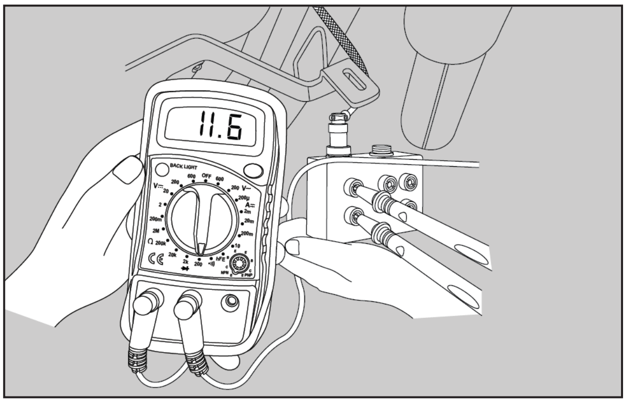
- Keep the multimeter in Resistance mode (200 Ohms)



- Connect the injector breakout box harness to Injector valve coupler

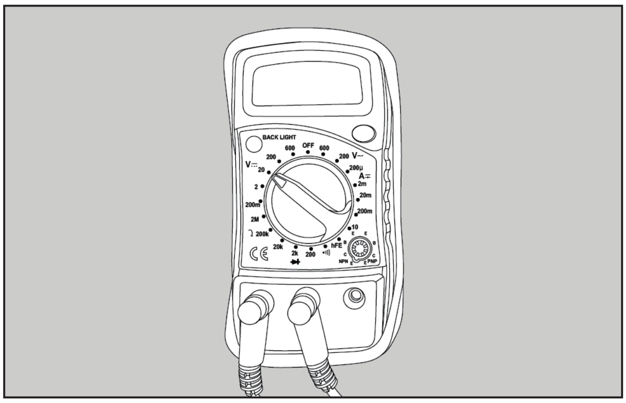


- To check the Resistance value of fuel Injector, connect the positive probe multimeter in socket 1 and negative probe socket 2 of the sensor breakout box. The resistance value is to be 11.4 to 12.6 Ohms @ 30+5°C

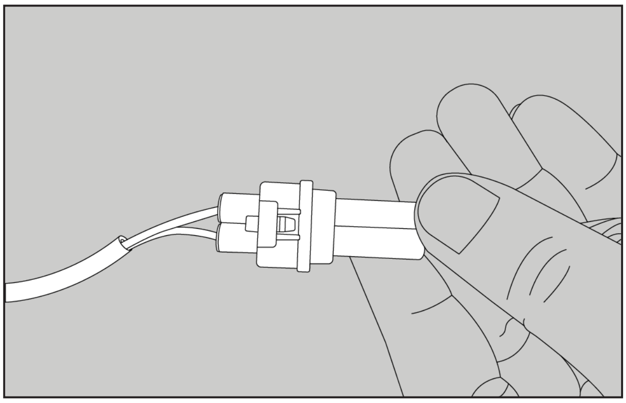


To check the input voltage

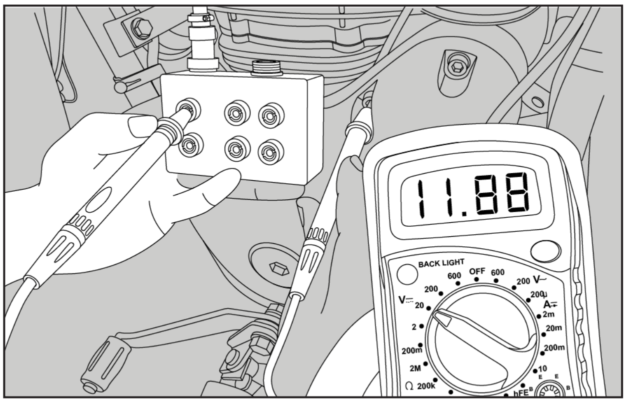
- Keep the multimeter in Voltage mode



- Connect the injector valve wiring harness coupler to Injector breakout box harness



- To check voltage at the wiring kit end, place the positive probe of the multimeter in socket 1 of the fuel Injector and place the negative probe of the multimeter to body ground. Turn "ON" the ignition and kill switch and the voltage should be battery voltage (12 V).



d. DECISION POINT:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (11.4 to 12.6 Ohms), you replace with Injector
- If the input voltage is meeting the specified limit and the resistance is within the specified limit and if continuity is available then you have to replace the ECU

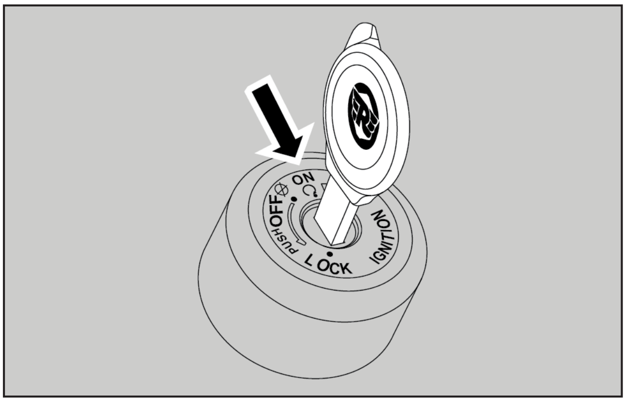
It is recommended to replace the injector /ECU/ Wiring harness as per the advice from Royal Enfield only

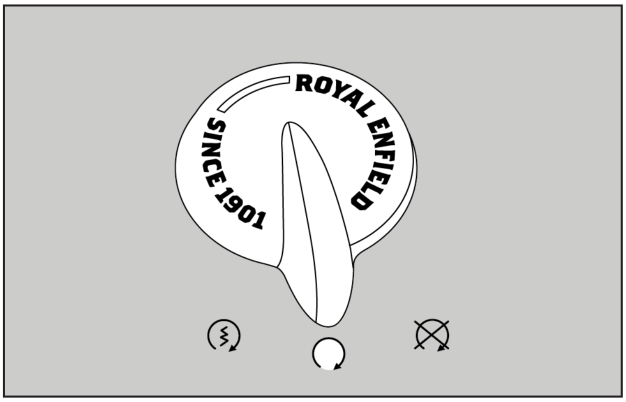
1.3. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





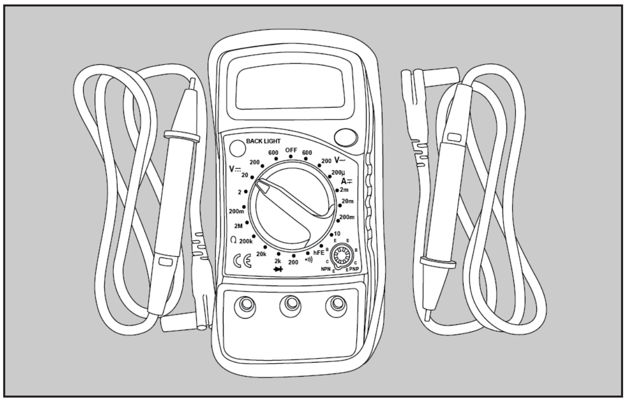
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

1.3.1. Test lead wire method :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **only to be used while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation any voltage fluctuation**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

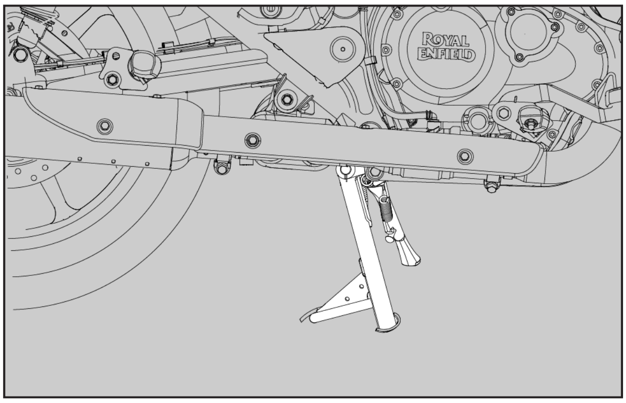


- Test lead wire (90 SERIES - Orange Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (hyperlink to be placed here)

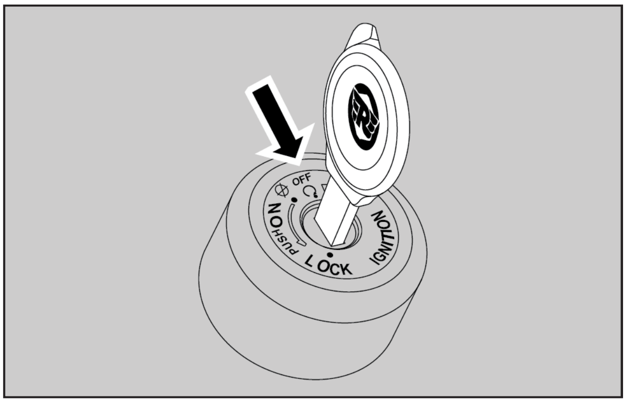
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

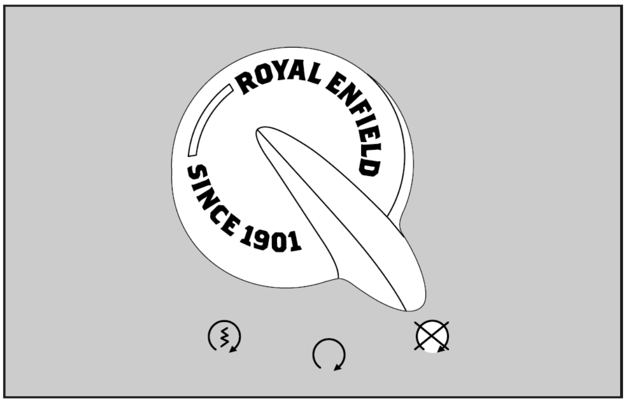
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition

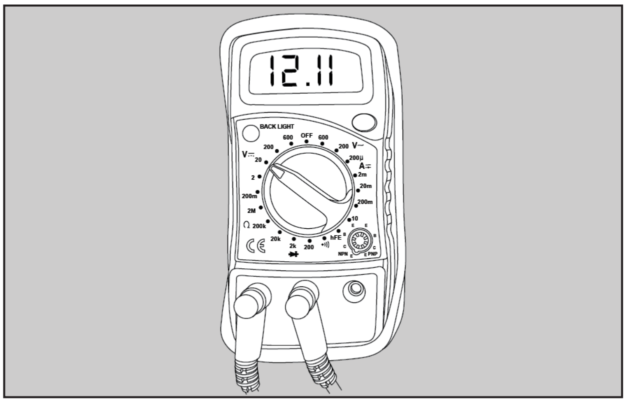

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)


12.11
BACK LIGHT
OFF
600
200
20
2
200m
2M
200k
20k
2k
200
V
200μ
A
2m
20m
200m
10
hFE
NPN
PNP

C. DIAGNOSTICS:

⚠ WARNING

Fuel Injector creates high pressure jets which can cause injury if exposed to the human body and also will cause damage to the painted surface.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

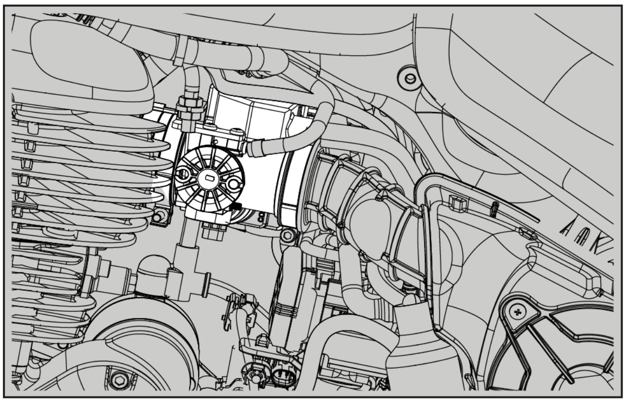
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Injector valve coupler*

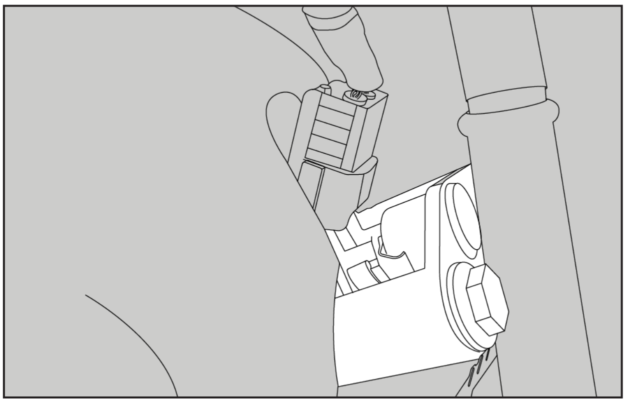
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

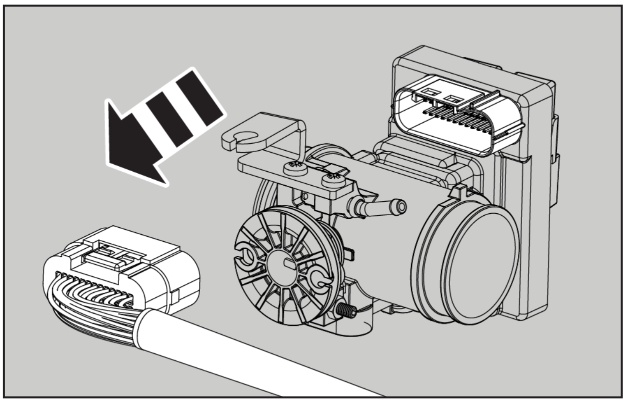
- ECU is located on the throttle body assembly



- The Injector is located on the intake manifold



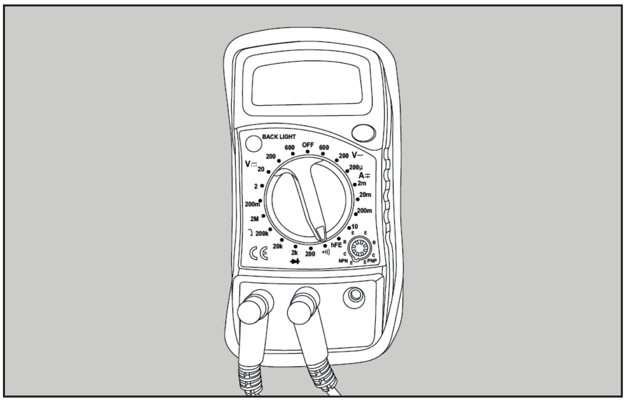
- Disconnect ECU from ECU wiring harness coupler



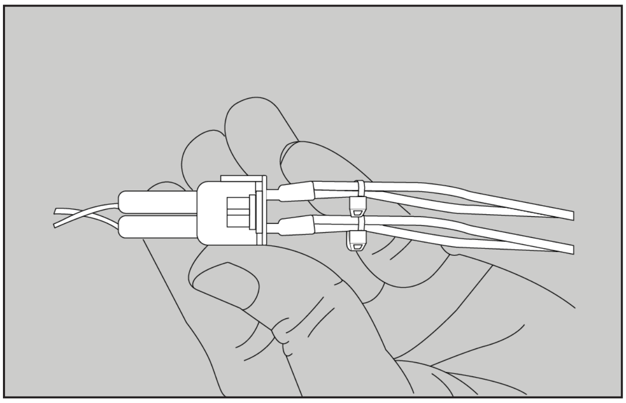
To check the Continuity of the wiring harness

STEP 1:

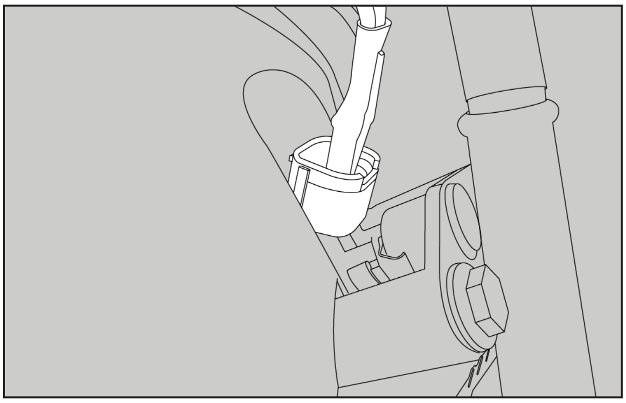
- Keep the multimeter in continuity mode.



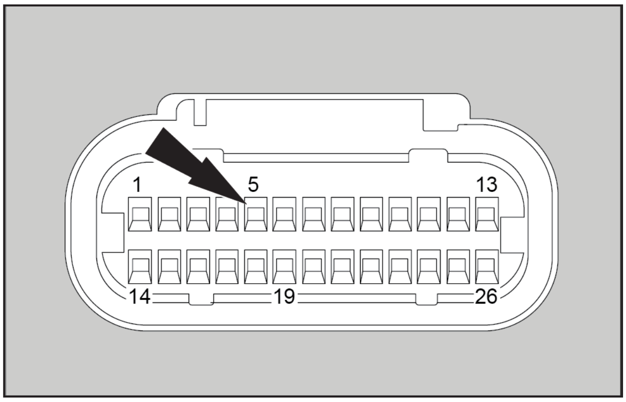
- Connect the Test lead wire 90 series (orange color) in the injector valve wiring harness coupler.
  - 90 series (orange color) with the Black tag in Pin 1 of injector valve wiring harness coupler
  - 90 series (orange color) with the red tag in Pin 2 of injector valve wiring harness coupler



- Keep the multimeter positive probe to Pin 2 (90 series test lead wire with the red tag) of the injector wiring harness coupler.



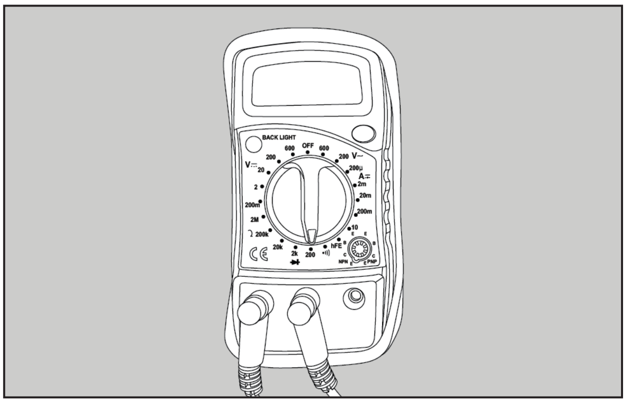
- Connect a 40 series test lead wire (yellow color) with the black tag to pin 5 of the ECU wiring harness coupler.



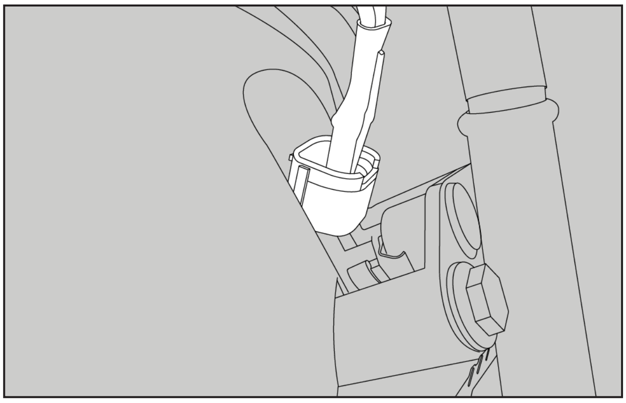
- Check for continuity (Beep Sound from the multimeter)

To check the Resistance

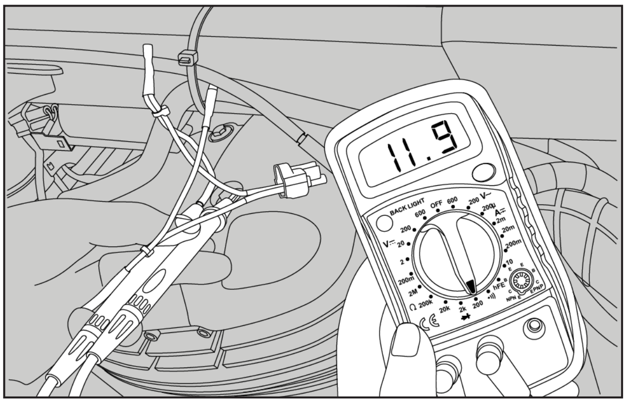
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Test lead wire 90 series (orange color) in the injector valve coupler.
  - 90 series (orange color) Test lead wire with the black tag in Pin 1 of injector valve coupler
  - 90 series (orange color) Test lead wire with the red tag in Pin 2 of injector valve coupler

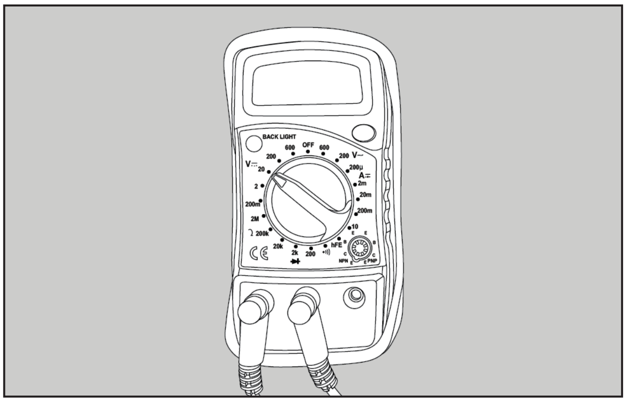


- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and Pin 2 (90 series test lead wire with red tag). Resistance value to be 11.4 to 12.6 Ohms @ 30+5°C

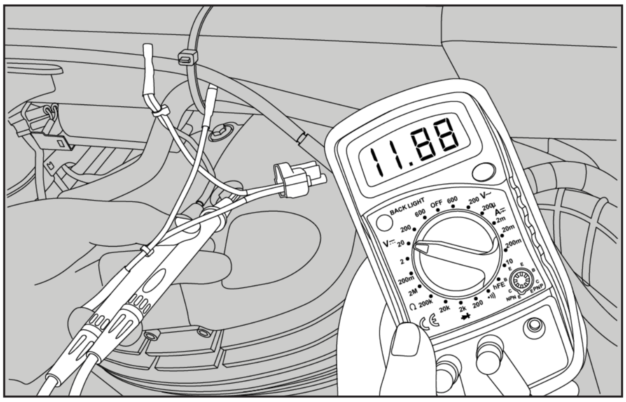


To check the Input voltage

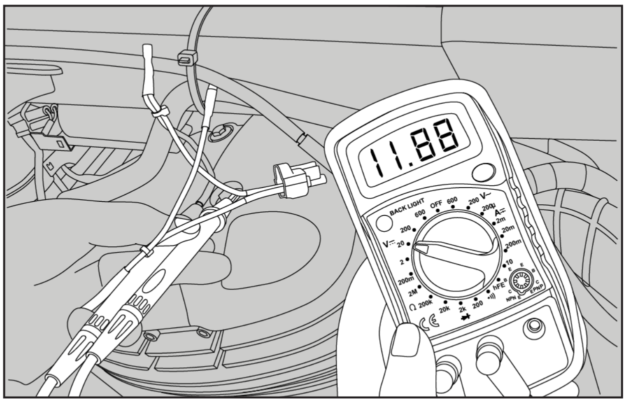
- Keep the multimeter in voltage mode (20 V)



- Connect the test lead wire 90 series (orange color) in the injector valve wiring harness coupler.
  - 90 series (orange color) with the black tag in Pin 1 of injector valve wiring harness coupler
  - 90 series (orange color) with the red tag in Pin 2 of injector valve wiring harness coupler



- To check the voltage of the sensor, connect the multimeter positive probe to pin 1(90 series Test lead wire orange color with black tag) and negative to body ground in the wiring harness coupler and turn on the ignition. The voltage should be equal to the battery voltage (12 V).



d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (11.4 to 12.6 Ohms), you replace with Injector valve
- If the input voltage is meeting the specified limit and the resistance is within the specified limit and if continuity is available then you have to replace the ECU

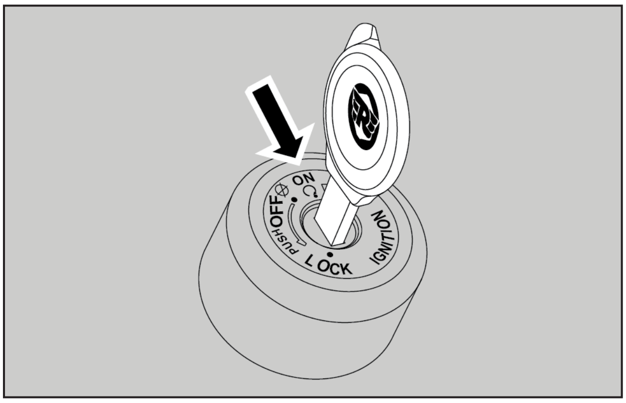
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

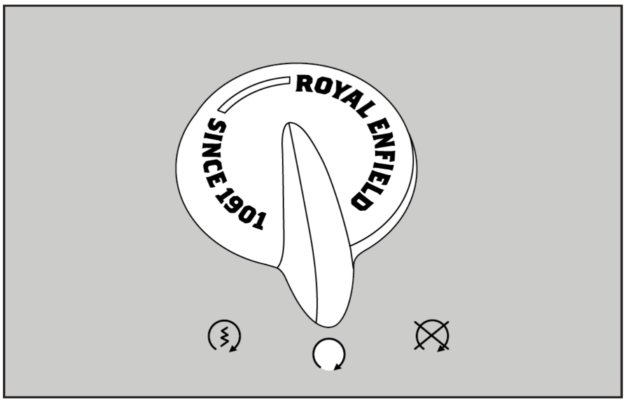
1.4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched “ON”, DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in “ON” Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Switch “OFF” the ignition key and again switch “ON” - repeat this cycle for 3 times till the MIL is “OFF”
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P0562 - BATTERY VOLTAGE

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0562	Battery voltage	Battery voltage low

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

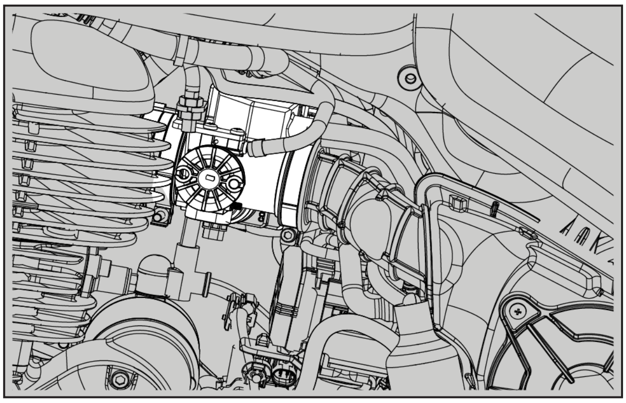
TROUBLE CODE : DTC CODE: P0562

Type of error : Battery voltage low

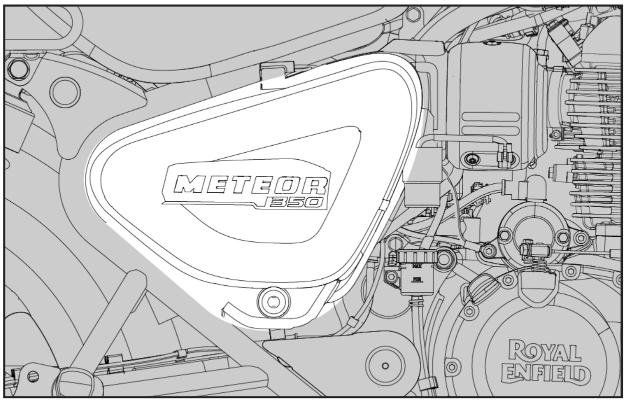
b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

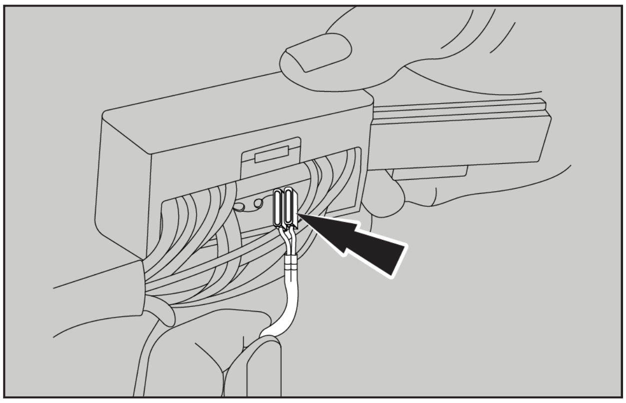
- ECU coupler is located in the Throttle body Assembly



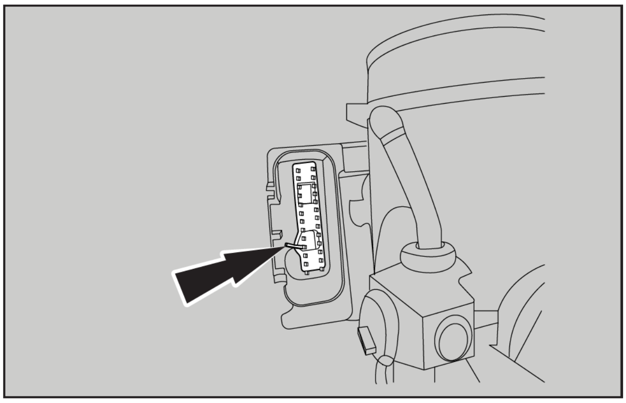
- The battery is located in right side Panel



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again.



- Ensure there is no bend or deformation on the pin of the ECU and Battery couplers, and check for any sulphur formation on the battery terminals, if found change the battery or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the Battery /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

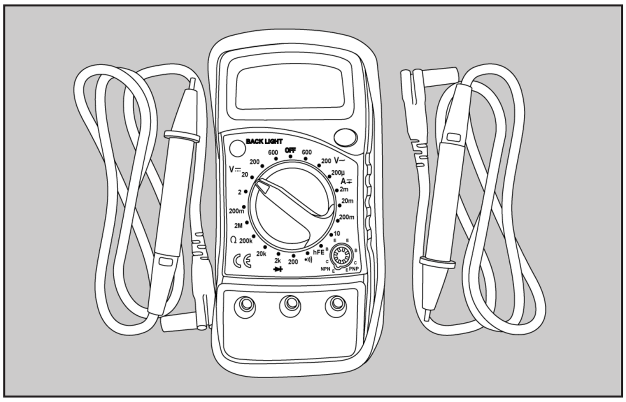
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

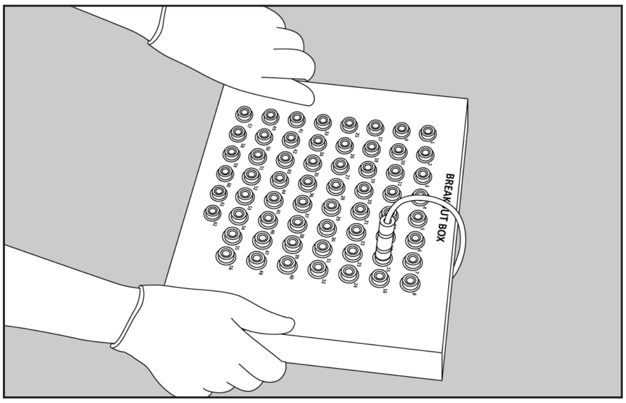
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)

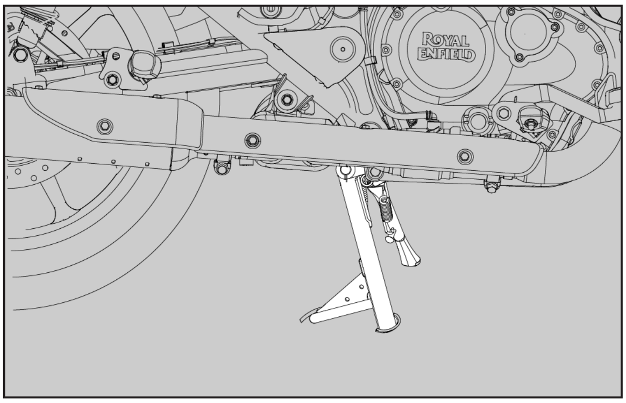


- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

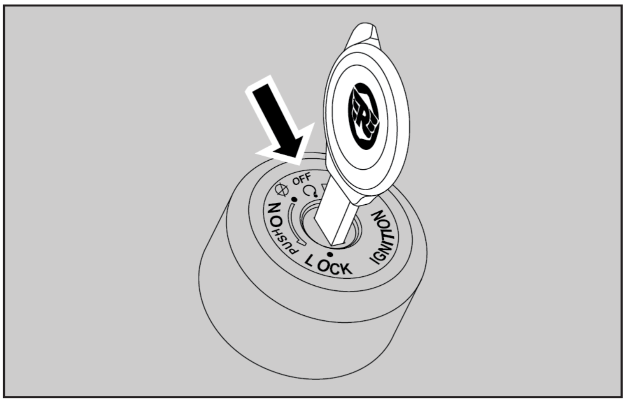


b. Pre-Checks:

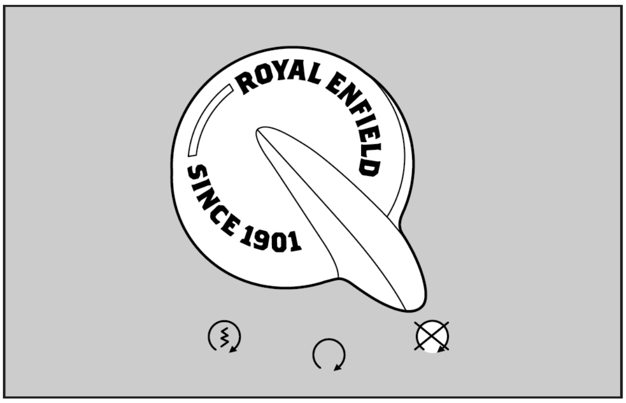
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition



- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12V
- (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)
- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

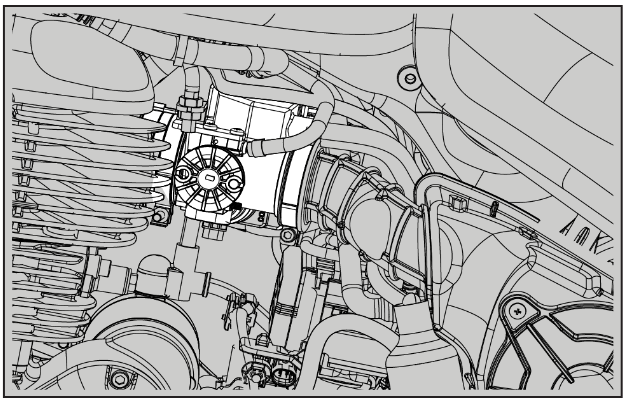
NOTE

- *Please remove right side panel from the motorcycle to access the battery*

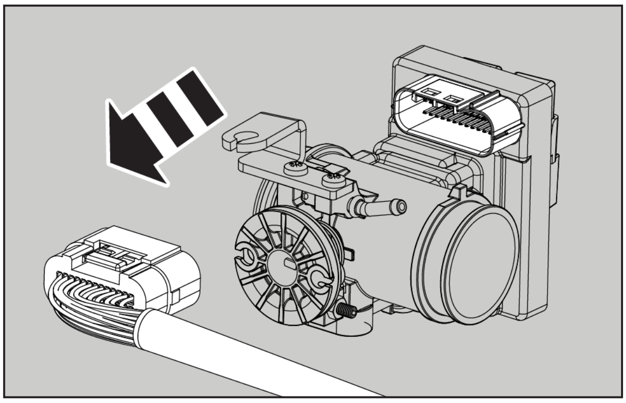
NOTE

- *Removal & refitment of right side panel mentioned in the service manual (exclusive hyperlink here)*

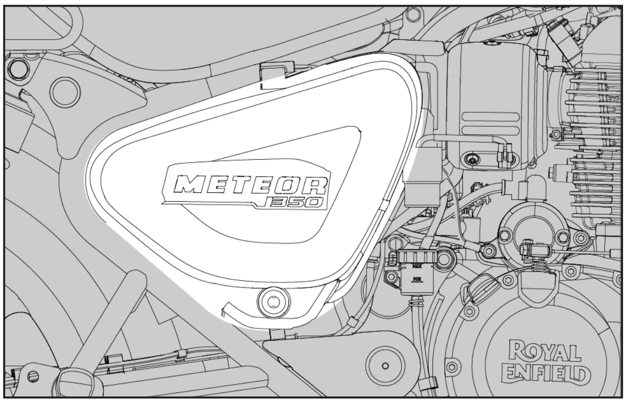
- ECU is located in the throttle body assembly



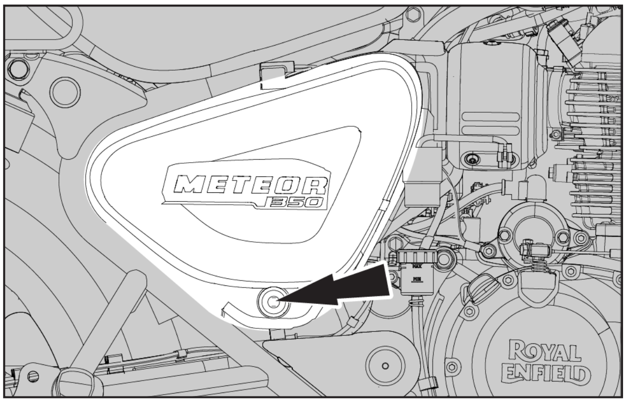
- Disconnect ECU coupler.

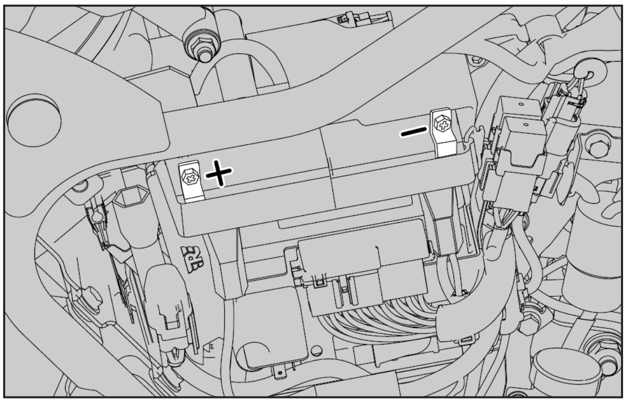


- The battery is Located in Right side panel

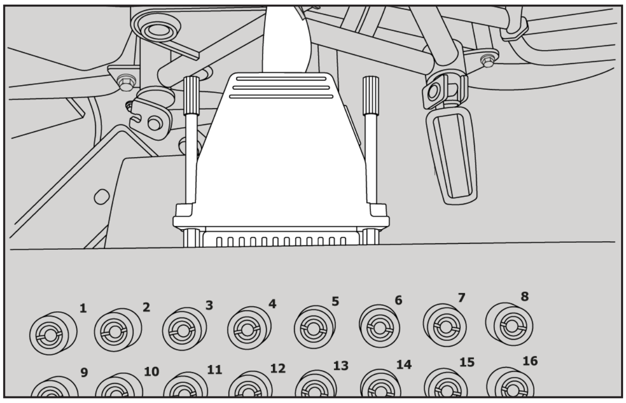

METEOR
350
ROYAL
ENFIELD

- Unlock RH side panel clockwise using key and gently locate the Battery


METEOR
350
ROYAL
ENFIELD



- Connect ECU breakout box harness coupler to Breakout box harness (62 Pin Kit)


1
2
3
4
5
6
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8
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11
12
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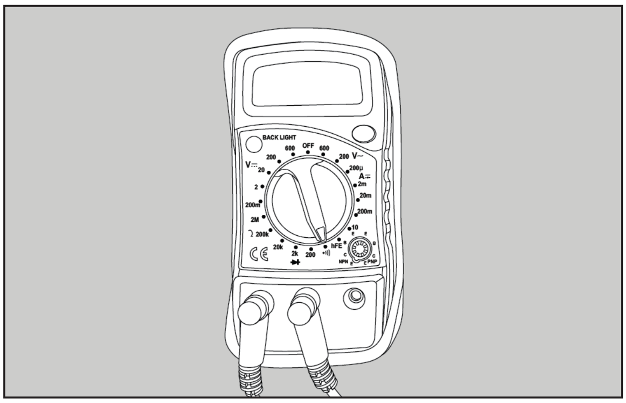
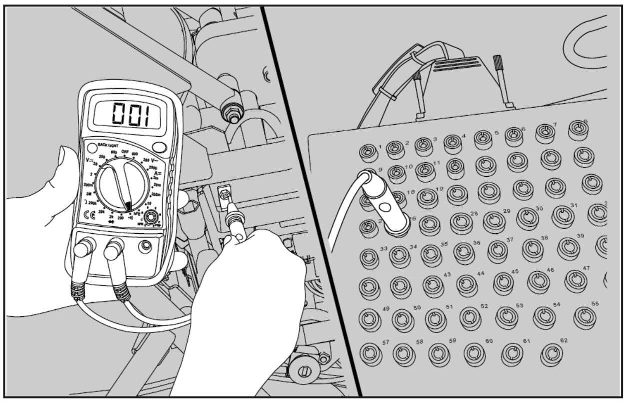
14
15
16

To check the Continuity of Wiring harness

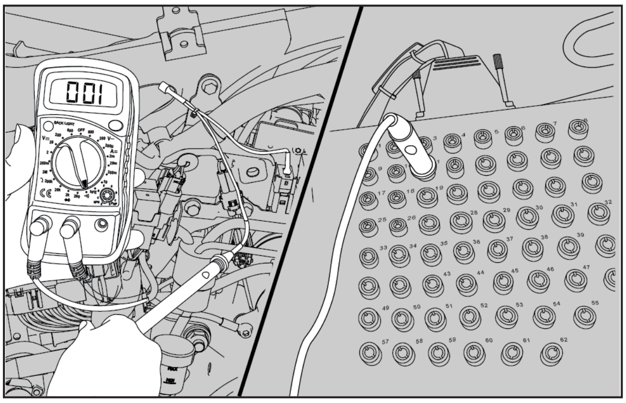
- Keep the multimeter in continuity mode.

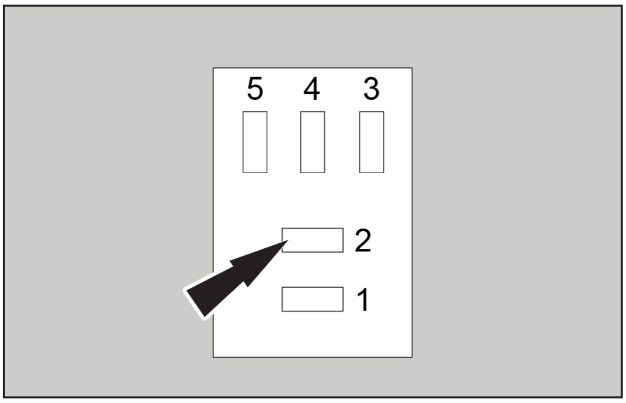

BACK LIGHT
OFF

- Disconnect the battery positive coupler and using multimeter Check between battery positive coupler in Wiring harness and Socket 26 of the ECU breakout box for continuity (Beep sound from multimeter)

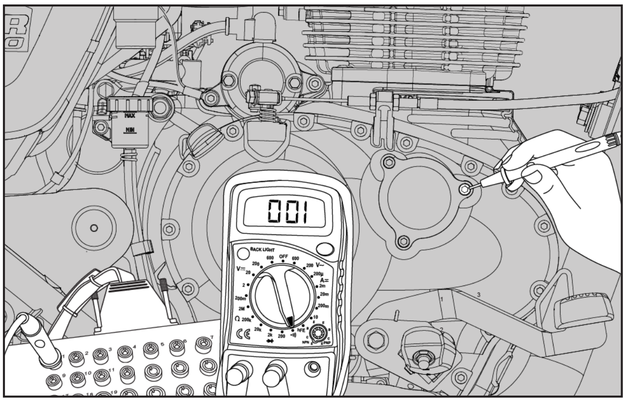


- Using multimeter check between Pin no 2 of the Power relay (Contact output) and Socket 11 of the ECU breakout box for continuity (Beep sound from multimeter)



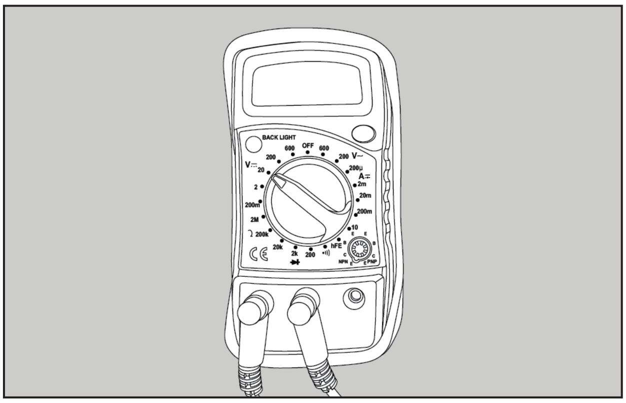


- Check between Body ground/Battery negative cable and Socket 1 of the ECU breakout box for continuity (Beep sound from multimeter)

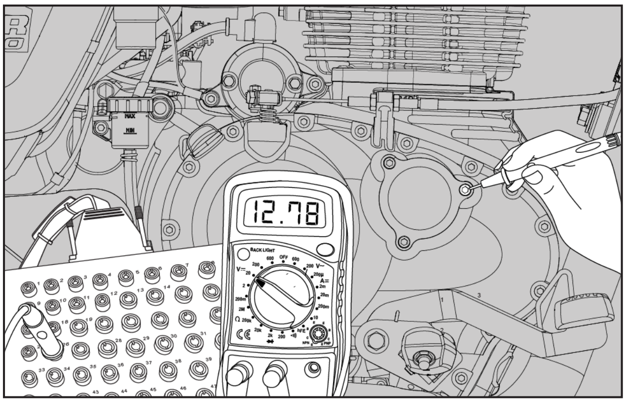


To check the voltage at ECU point (input voltage check)

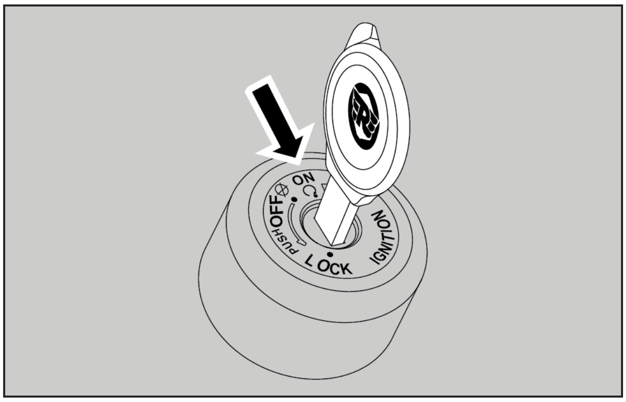
- keep the multimeter in voltage mode (20V)

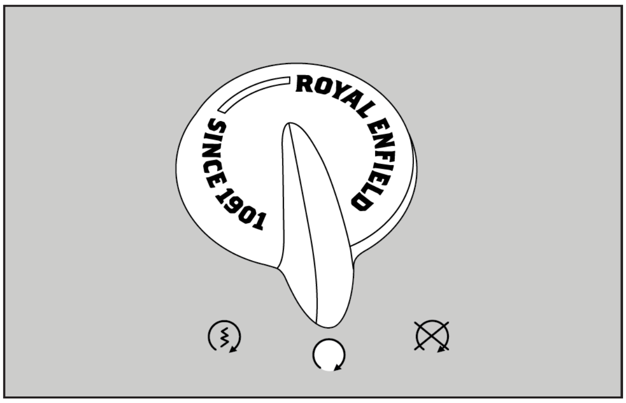


- Place the Multimeter positive probe in Socket 26 of the ECU breakout box and negative probe in Body ground or Battery Negative, Check the Open circuit voltage (OCV), it should be greater than 12V.

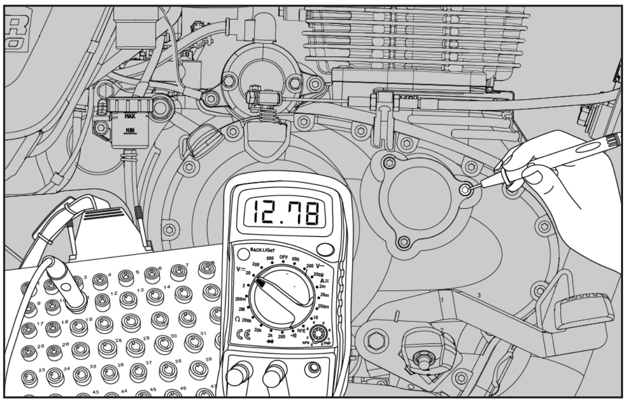


- Turn “ON” the Ignition switch and Kill switch


ON
OFF
PUSH
LOCK
IGNITION

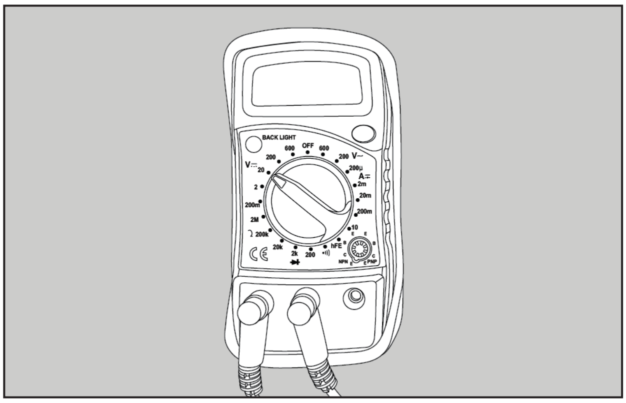

ROYAL ENFIELD
SINCE 1901

- Place the Multimeter positive probe in Socket 11 of the ECU breakout box and negative probe in Body ground or Battery Negative. Check the Voltage, it should be greater than 11.8V.

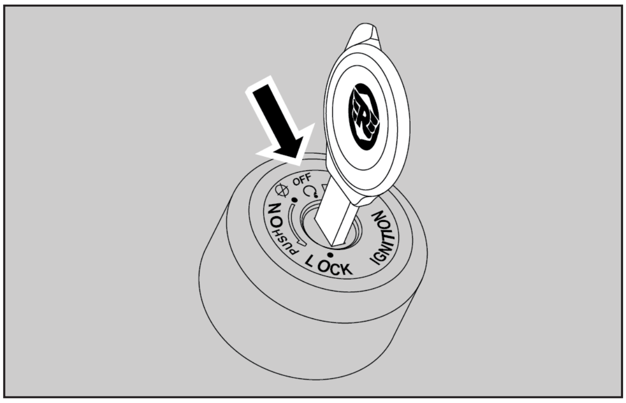


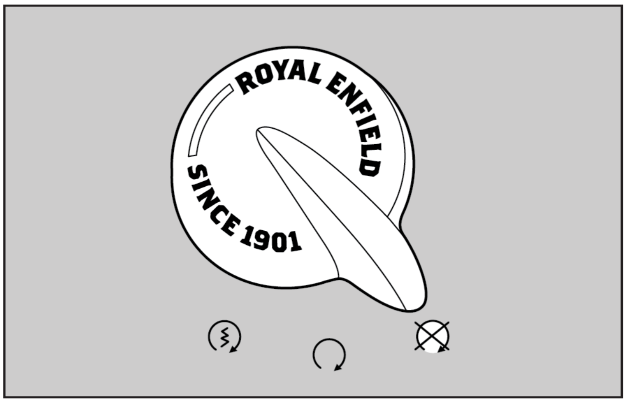
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

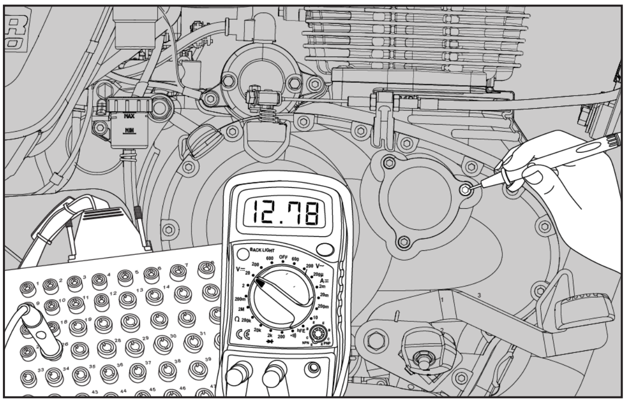

BACK LIGHT
OFF

- Turn “ON” the Ignition switch, Kill switch and start the vehicle and run at idling RPM

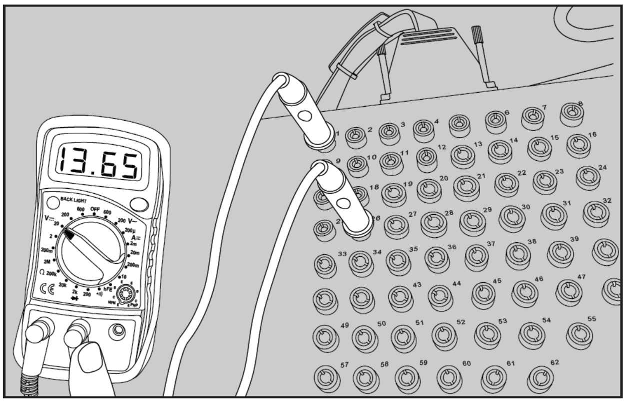

OFF
ON
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Place the Multimeter positive probe in Socket 26 of the ECU breakout box and negative probe in Body ground or Battery Negative. Check the voltage, It should be increased from open circuit voltage (OCV) and should be less than 14.7V



- Similarly, place the multimeter positive probe in Socket 11 of the ECU breakout box and negative probe in Socket 1 of the ECU breakout box or Body ground or Battery Negative, Check the voltage. It should be increased from Initial voltage and should be less than 14.7V



d.Decision point

- If the Resistance is not within the specified limit, You may please replace the Stator coil
- If stator coil resistance is as per specifications but If the voltage is not within the specified limit, You may please replace the RR unit.

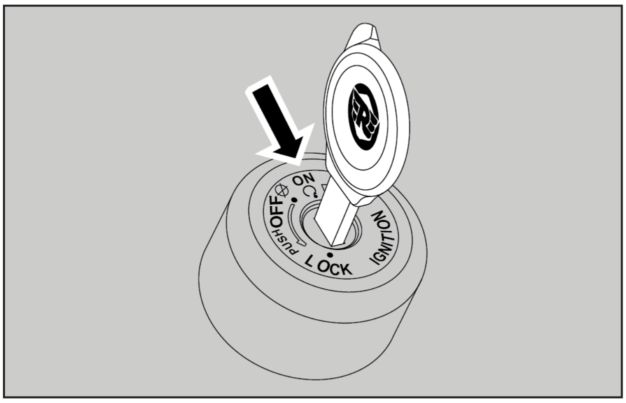
3. If the continuity is found Ok and Voltage is not meeting the specification, then you have to check the Stator coil and RR Unit by following the checking procedure of the Stator coil and RR Unit.

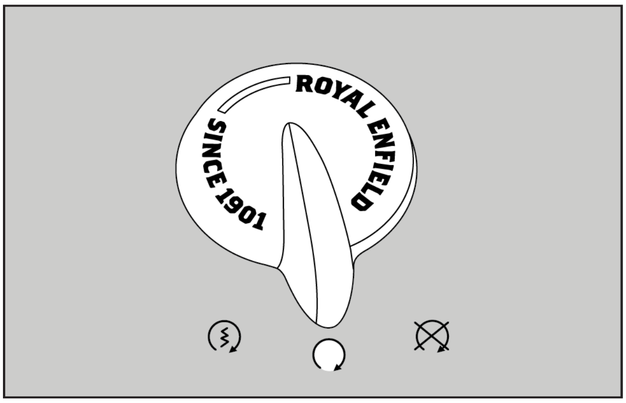
It is recommended to replace the Battery/RR Unit/ Stator Coil /ECU / Wiring Harness as per the advice from Royal Enfield only

DTC Clearing Procedure:

⚠ CAUTION
• **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





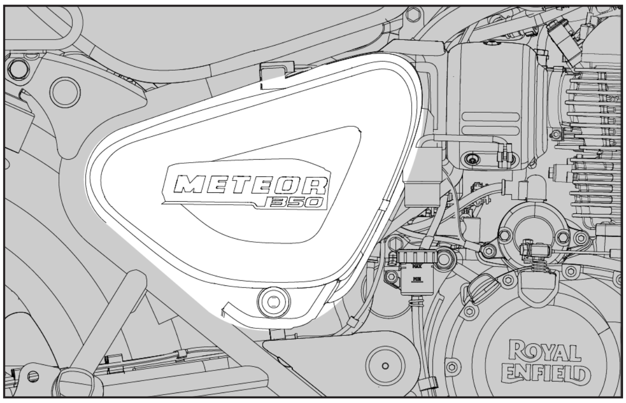
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

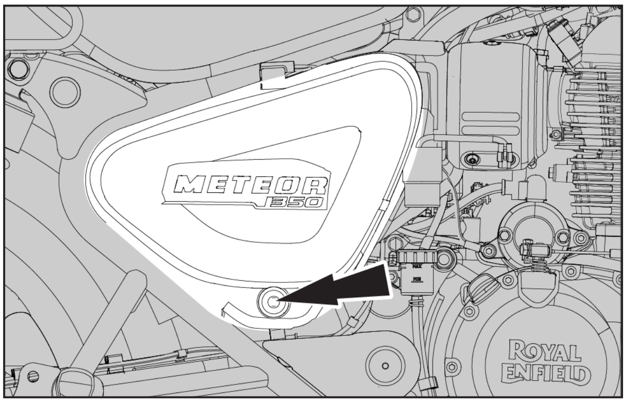
NOTE

- *Please note that the test lead wire method to check this error code is not recommended by RE, hence suggesting you perform a direct method to fix this error code using multimeter itself. Please follow the steps mentioned below.*

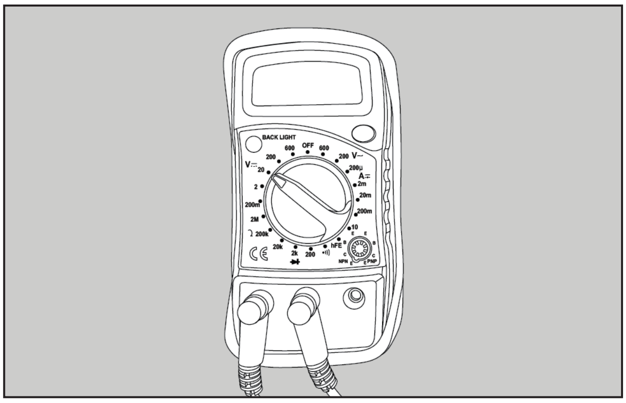
- The battery is Located in Right side panel


METEOR
350
ROYAL
ENFIELD

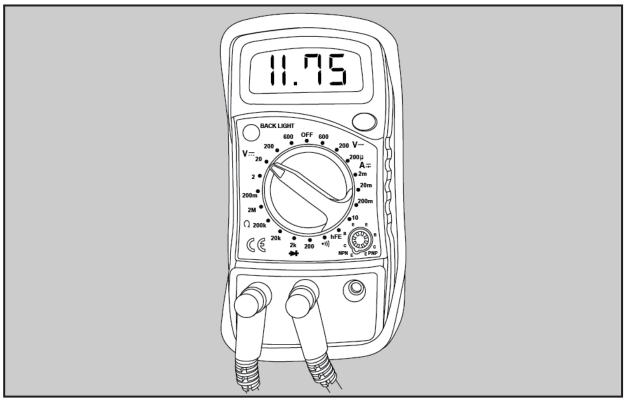
- Unlock RH side panel clockwise using key and gently locate the Battery


METEOR
350
ROYAL
ENFIELD

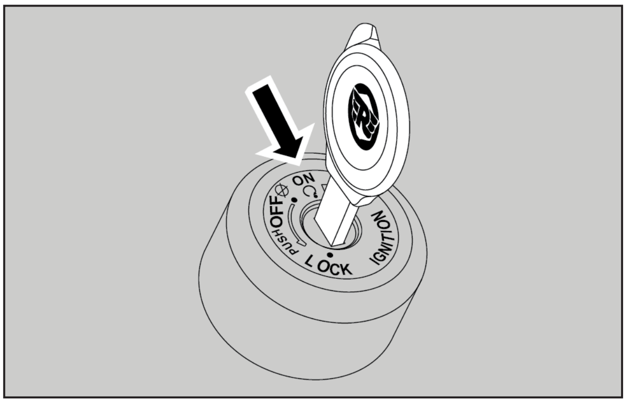
- Keep the multimeter in Voltage mode (20V)

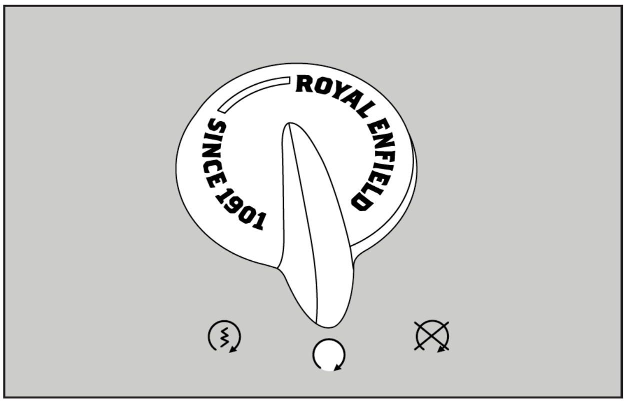


- Place the Positive probe of the multimeter on the Positive terminal of the battery and Negative probes of multimeter in the negative terminal of the battery and check for battery voltage Open circuit voltage (OCV), it should be 12 V (battery voltage)

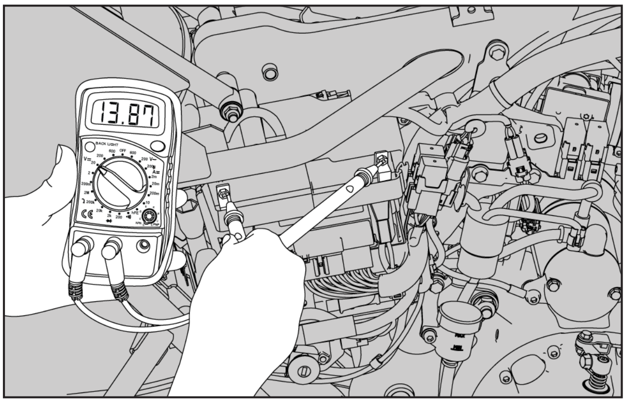


- Turn "ON" the kill switch and ignition switch


ON
OFF
PUSH
LOCK
IGNITION

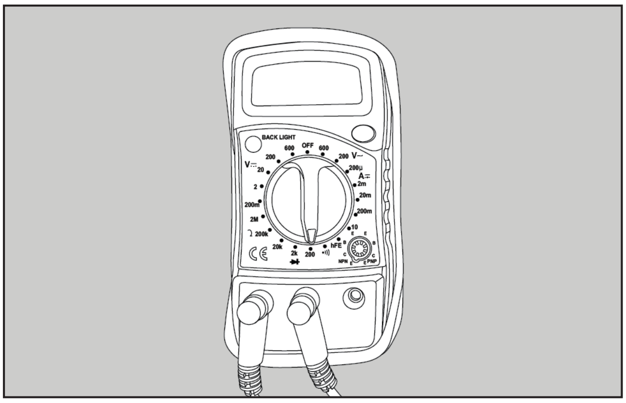

ROYAL ENFIELD
SINCE 1901

- Start the engine and check for output voltage at battery terminals Closed-circuit voltage (CCV). At engine idling RPM, the output voltage should be greater than the voltage observed while the engine is off. Give throttle and increase the throttle and keep the RPM at 2000 to 2500 RPM. The Charging voltage should be between 13.5 V to 14.7 V

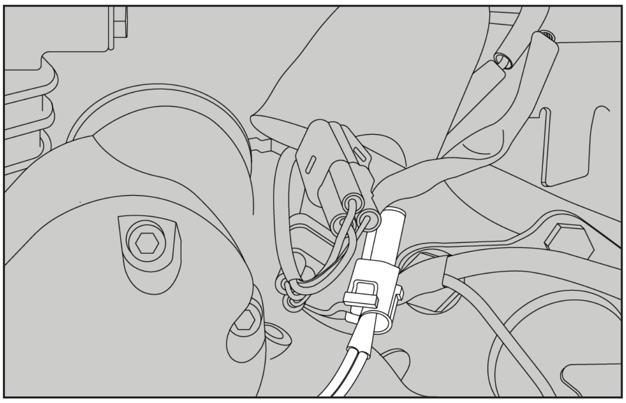


To Check Stator Coil

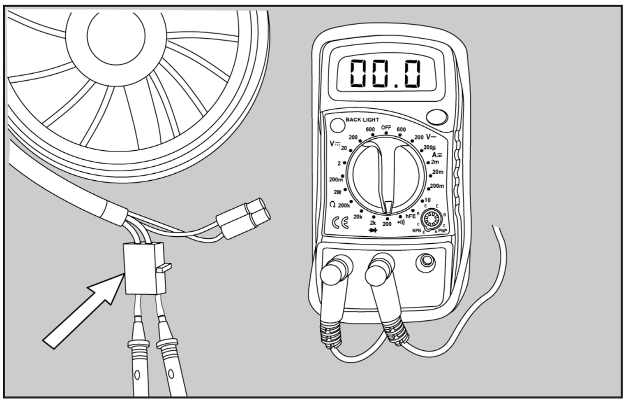
- Keep the multimeter in resistance mode

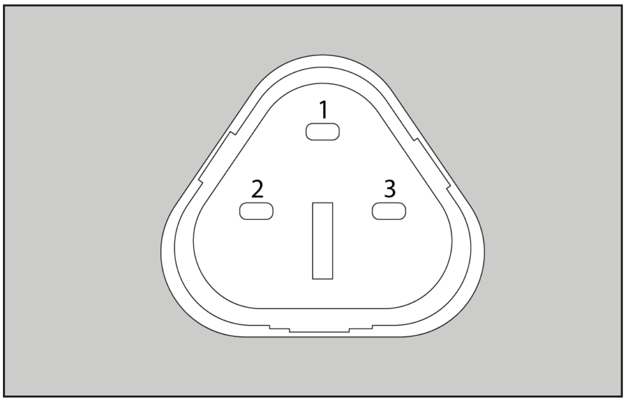


- Stator Coil is located on the LH Case
- Loosen the stator coil coupler



- Place the Positive and Negative probes of multimeter in the Stator coil coupler on the stator coil as mentioned below.
- Keep the multimeter in Resistance mode (200 Ohms), Check the resistance between
    - PIN 1 - PIN 2 = 0.280 Ohms to 0.380 Ohms
    - PIN 2 - PIN 3 = 0.280 Ohms to 0.380 Ohms
    - PIN 3 - PIN 1 = 0.280 Ohms to 0.380 Ohms





d.Decision point

1. If voltage is not meeting the specification, then you have to check the Stator coil and RR Unit by following the checking procedure of the Stator coil and RR Unit.
2. If the Resistance is not within the specified limit, You may please replace the Stator coil
3. If stator coil resistance is as per specifications but If the voltage is not within the specified limit, You may please replace the RR unit.

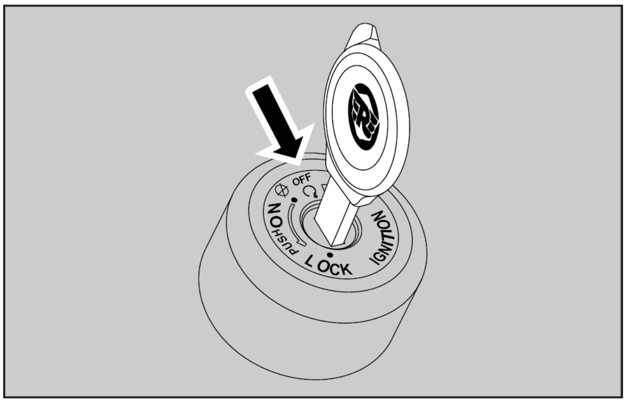
   It is recommended to replace the Battery/RR Unit/ Stator Coil /ECU / Wiring Harness as per the advice from Royal Enfield only

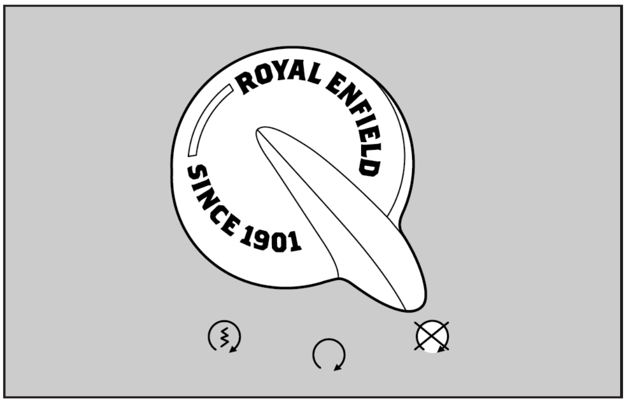
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P0627 - FUEL PUMP
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0627	Fuel pump	Fuel pump Circuit Low / Open

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0627

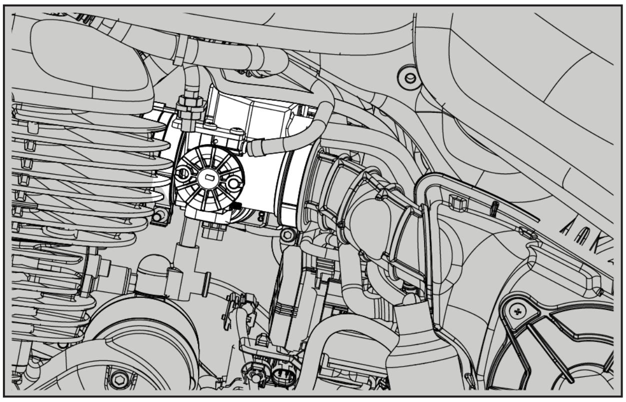
Type of error : Fuel pump Circuit Low / Open

(i) Information : Fuel Pump circuit fault / Fuel pump internal fault

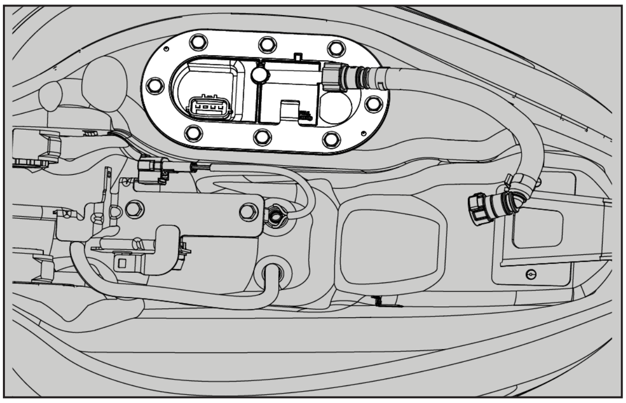
b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

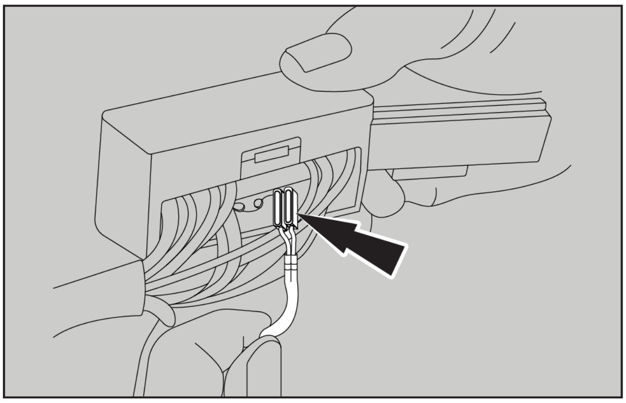
- ECU coupler is located in the Throttle body Assembly



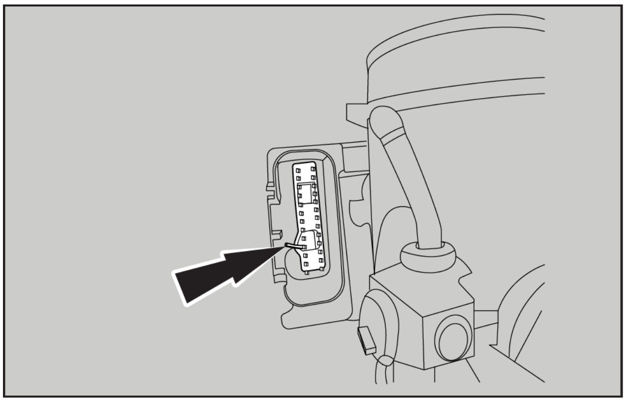
- Fuel pump coupler is located beneath the fuel tank



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Fuel Pump couplers, if found change the Fuel Pump or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

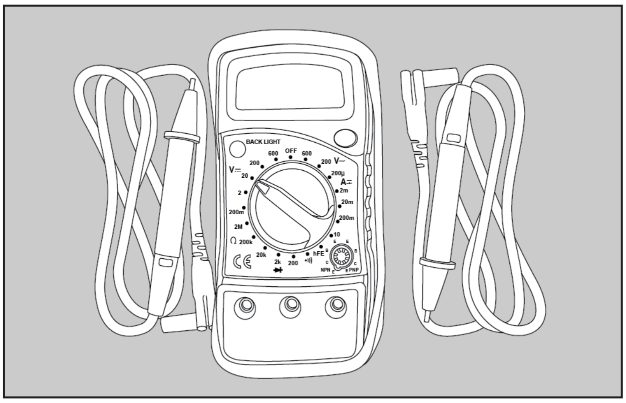
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

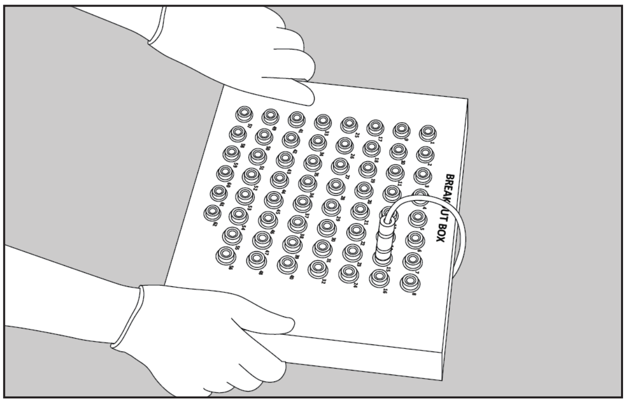
1.3 - Using Test lead wire method

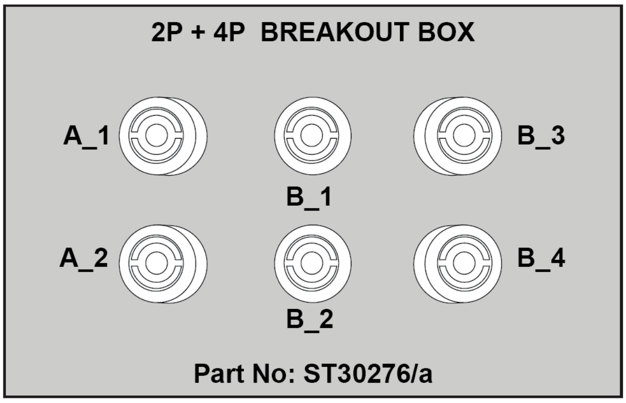
1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)



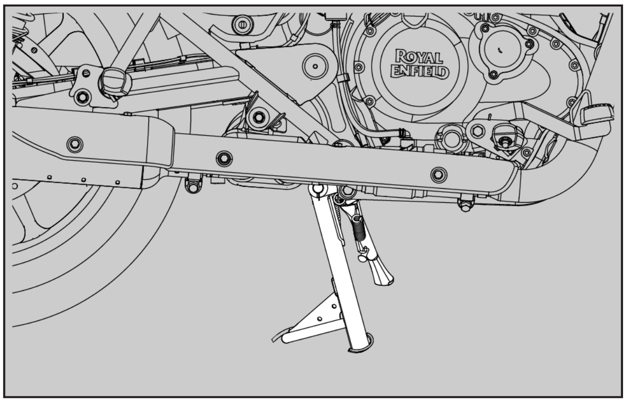
- Breakout Box (26 PIN ECU ST 30923/A & 62 P ECU Breakout Box ST 30275/A)


BREAKOUT BOX

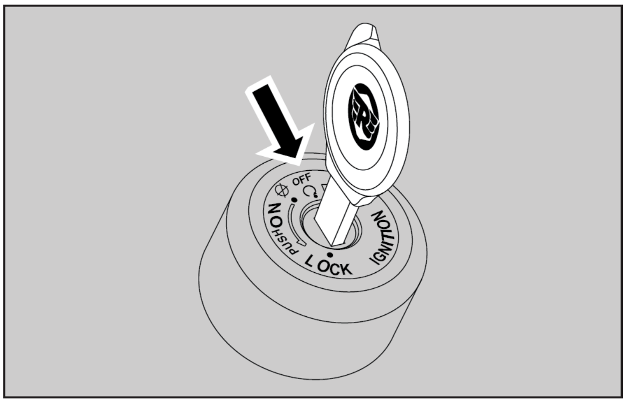

2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

b. Pre-Checks:

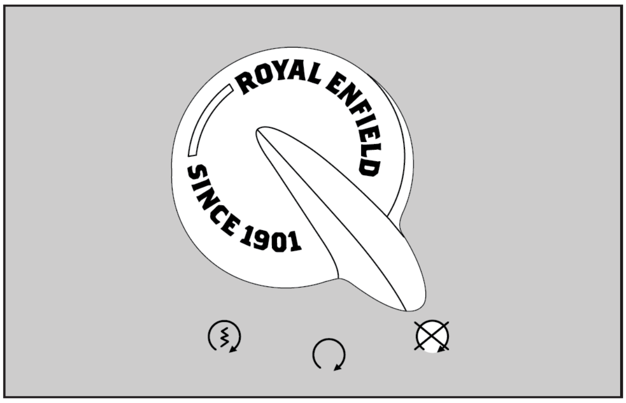
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition

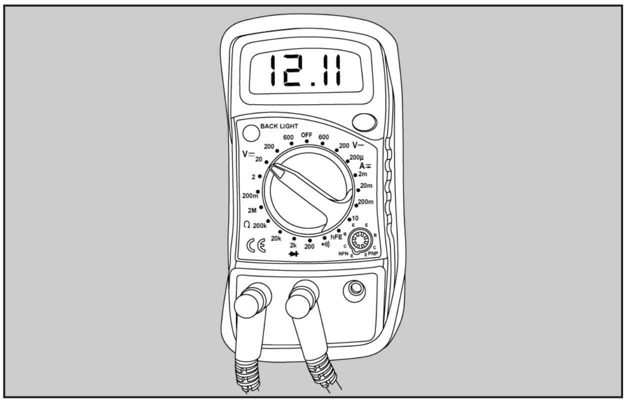

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V
- (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.


12.11
BACK LIGHT

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

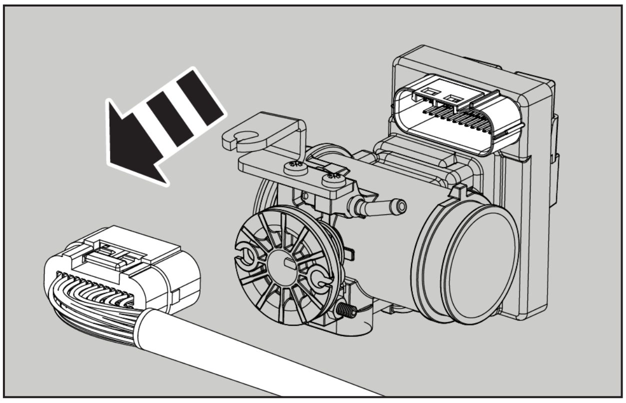
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Fuel pump coupler*

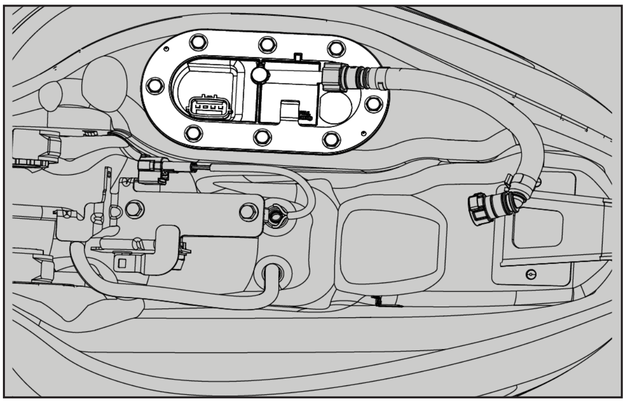
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

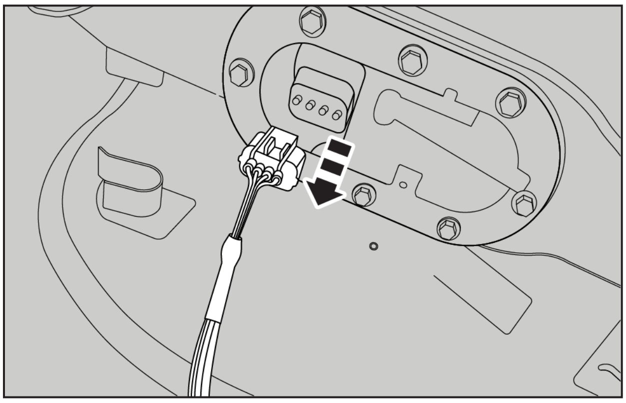
- Disconnect ECU coupler.

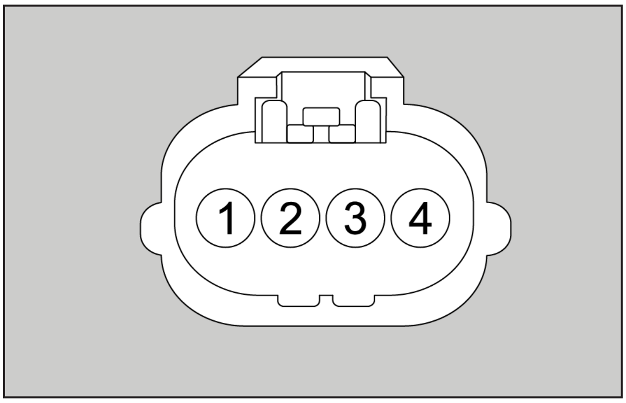


- Fuel pump is located in the fuel tank

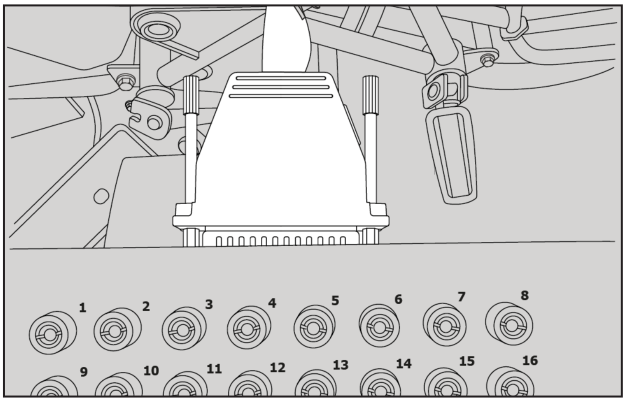


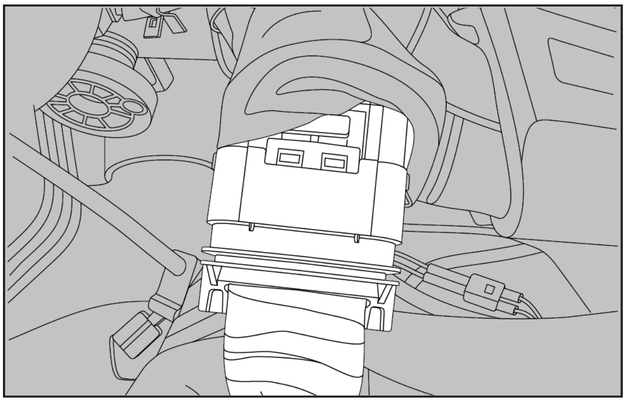
- Disconnect Fuel pump coupler



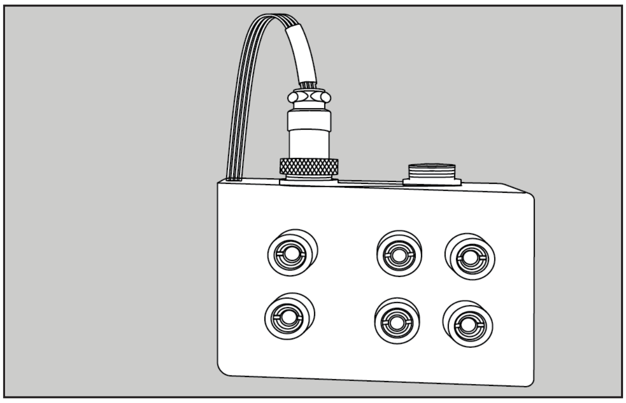


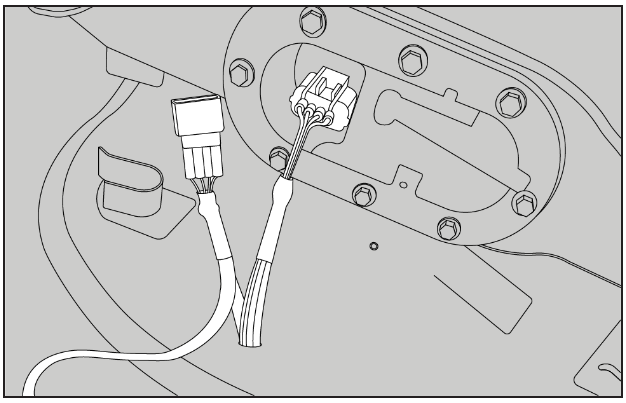
- Connect ECU and Breakout box Harness (62 Pin).



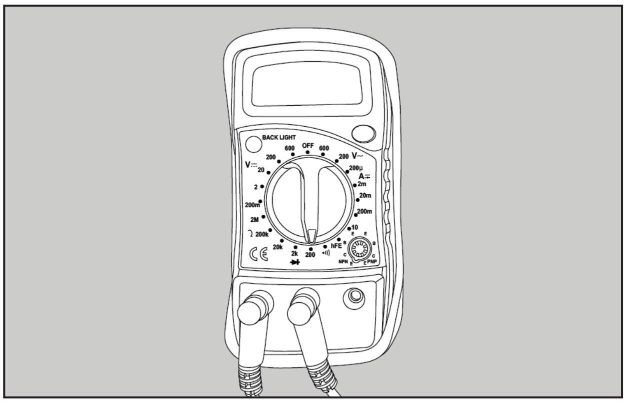


- Connect Fuel pump connector cable to Breakout Box (6 Pin)

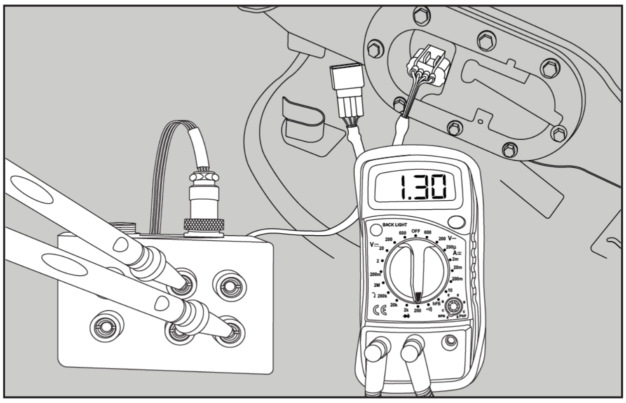




- Keep the multimeter in Resistance mode (200 Ohms)

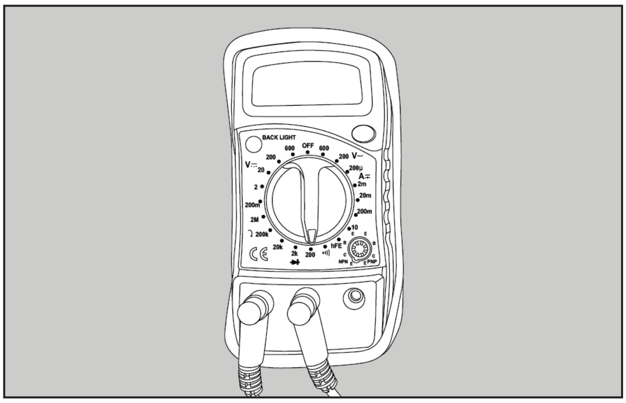


- To check the Resistance value of fuel Pump, connect the multimeter in Pin 1 and Pin 4. The resistance value is to be 1.0 – 1.8 Ohms

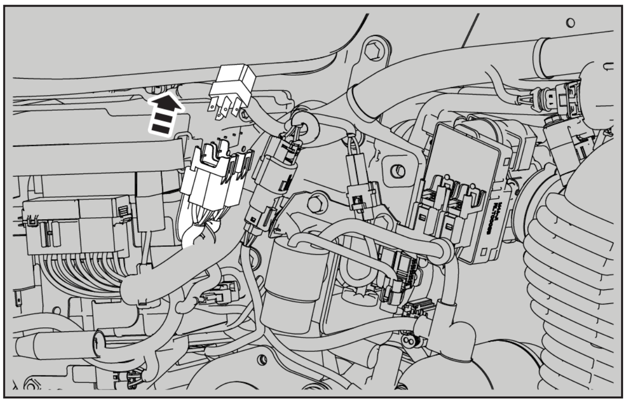


To check the Resistance of Fuel pump relay coil

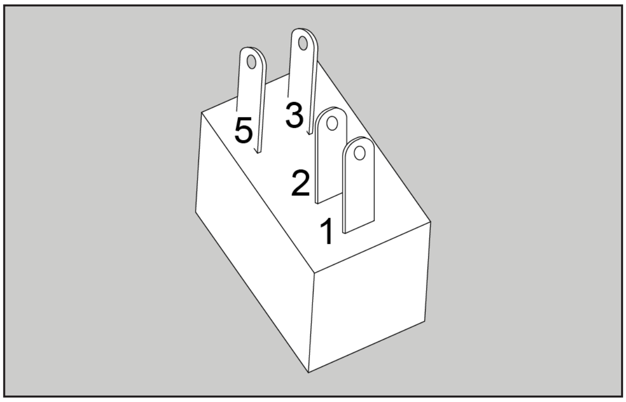
- Keep the Multimeter in Resistance mode 200 Ohm

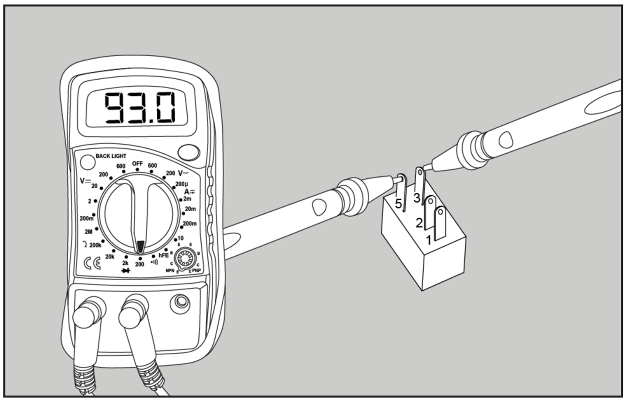


- Disconnect fuel pump relay located inside right-side panel

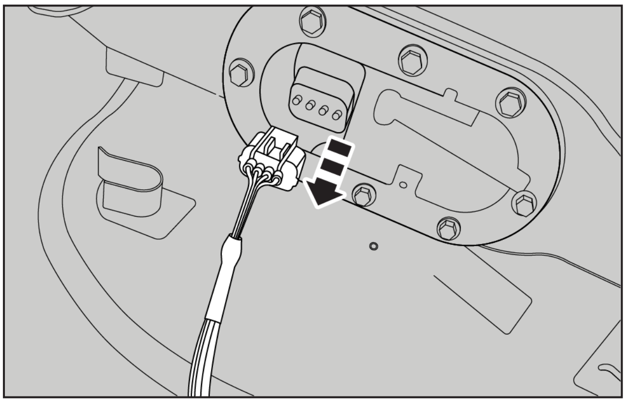


- Using a multimeter, check the Resistance of Fuel pump relay coil between pin 3 and pin 5. Resistance should be between 82Ω to 102Ω @ 30 5°C



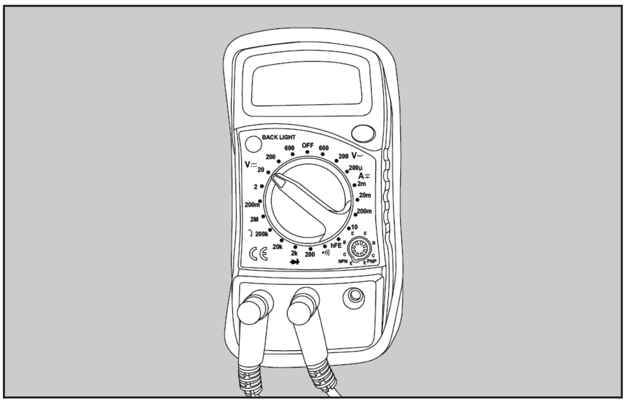


- Disconnect the cable from the Fuel pump end and connect it to the wiring harness end using the other coupler present in the harness.

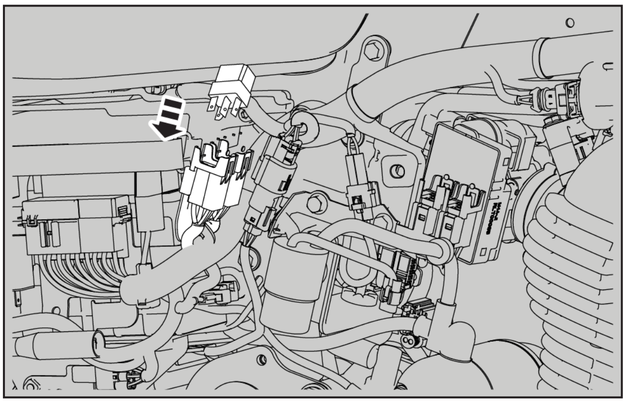


To check the voltage at ECU point (input voltage check)

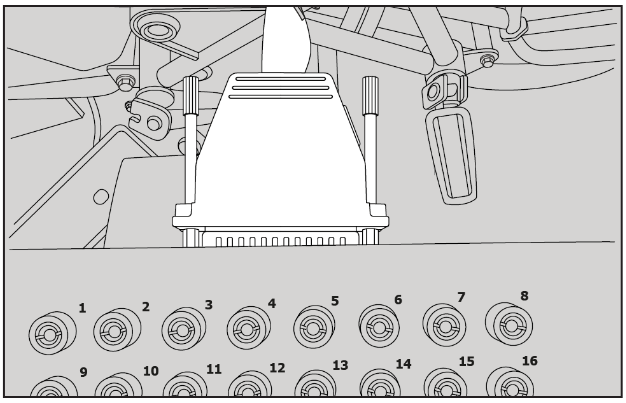
- Keep the Multimeter in Voltage mode 20 V.

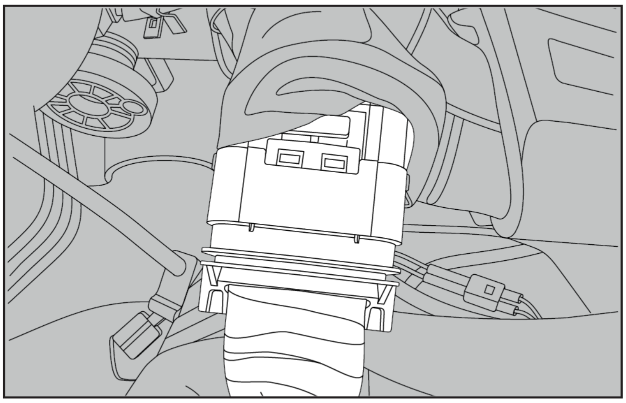

BACK LIGHT
600
OFF
600
200
V
20
2
200m
2M
200k
20k
2k
200
200µ
A
2m
20m
200m
10
hFE
NPN
PNP

- Place the fuel pump relay in the corresponding Fuel pump relay holder

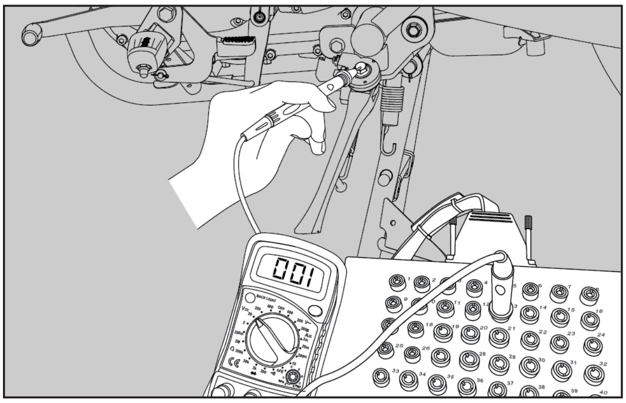


- Connect the ECU breakout box to ECU and wiring harness

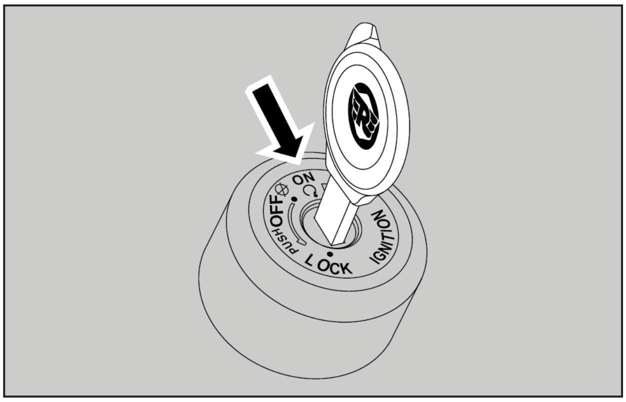

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

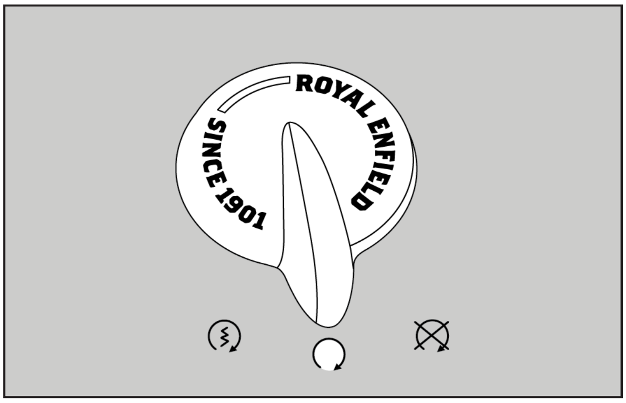


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 13 of the ECU breakout box and place the negative probe of the Multimeter to body ground or Battery Negative or Socket 1 of the ECU breakout box.

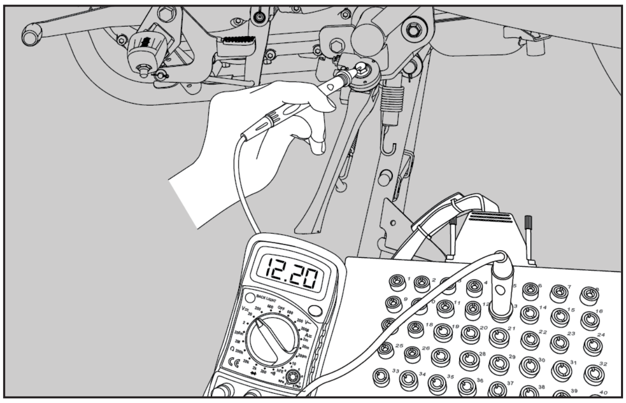


- Turn “ON” the ignition and kill switch


ON
OFF
PUSH
LOCK
IGNITION

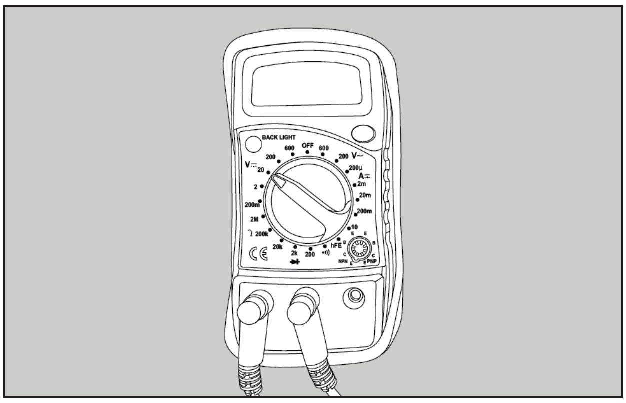

ROYAL ENFIELD
SINCE 1901

- Check the voltage, it should be 12 V in the Multimeter.

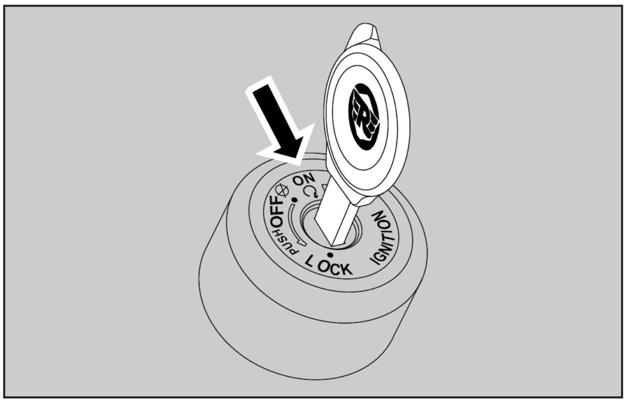


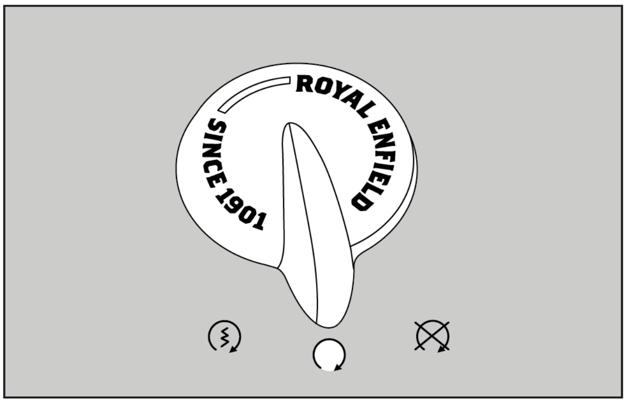
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

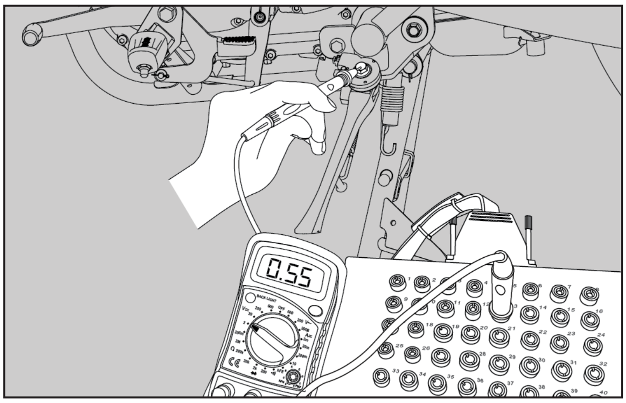

BACK LIGHT
600
OFF
600
200
V
200
V
20
200µ
A
2
2m
20m
200m
200m
2M
200k
10
20k
2k
200
hFE

- Turn ‘ON” the Ignition switch, Kill switch and start the vehicle


ON
OFF
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Connect across socket 13 of the ECU breakout box and body ground or Battery Negative or Socket 1 of the ECU breakout box. Check the Voltage it should be 0.55V.



d. DECISION POINT:

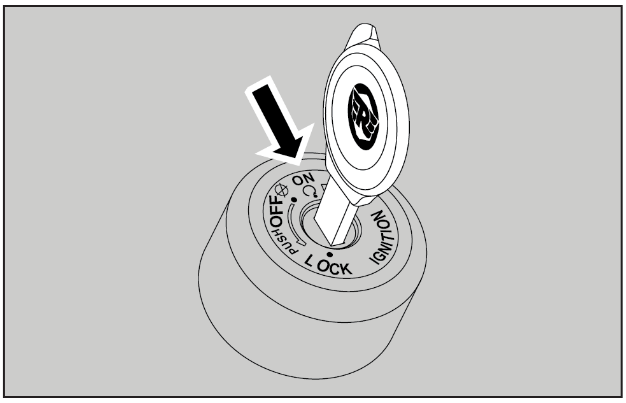
- If the resistance is not within the specified limit (82-102 Ohms @30+5°C), you replace it with the fuel pump relay.
- If the output voltage is 0V and the fuel pump is not priming (when trying to start the engine) and if continuity is available then you may replace the ECU.
- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.

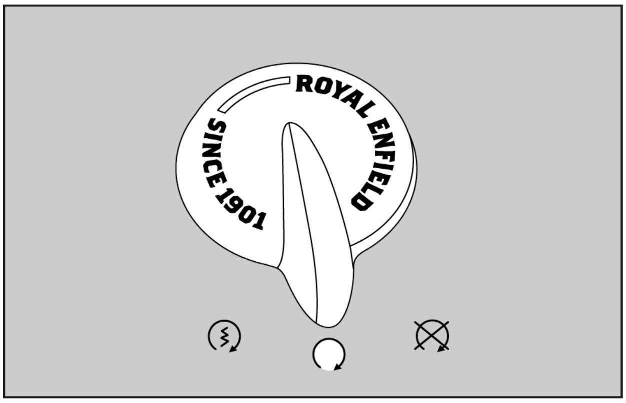
It is recommended to replace the fuel pump relay /ECU / Wiring Harness as per the advice from Royal Enfield only

DTC Clearing Procedure:

⚠ CAUTION
• **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





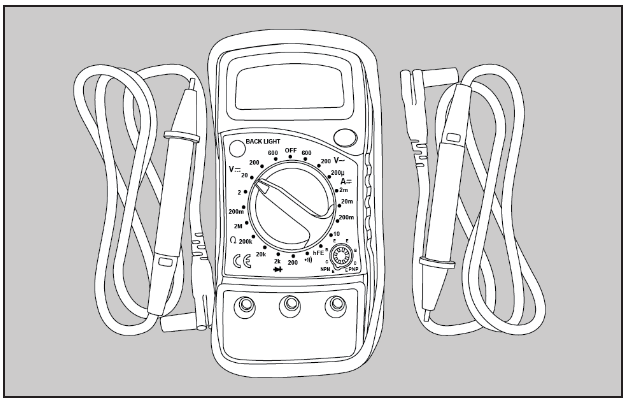
- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

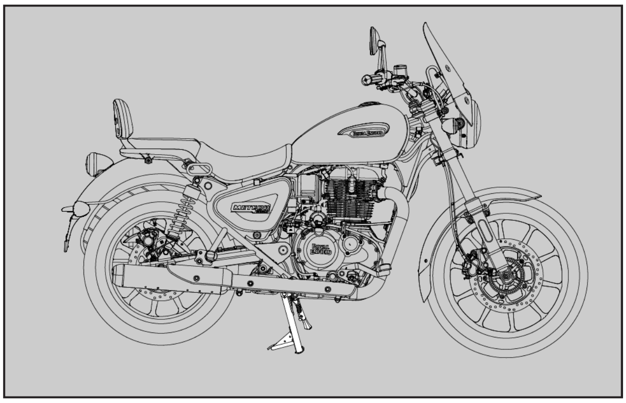


- Test lead wire (90 series - Orange color)
- Test lead wire (40 Series - Yellow color)
- Refer Chart for Color identification of Pins

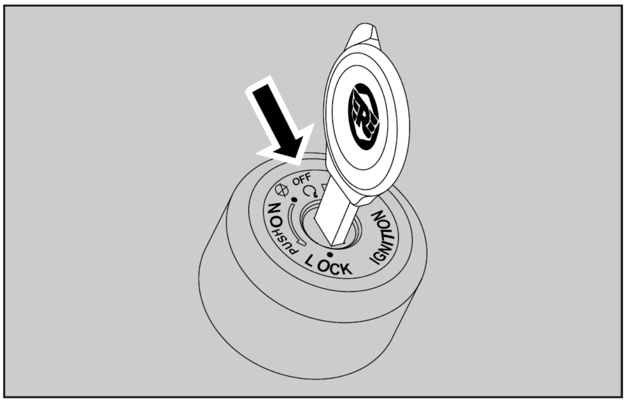
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

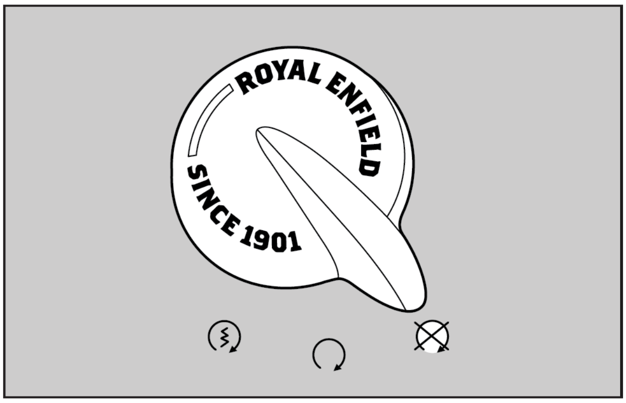
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

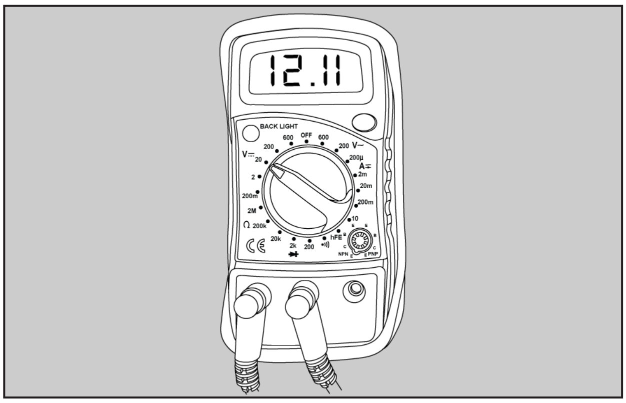


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION
Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

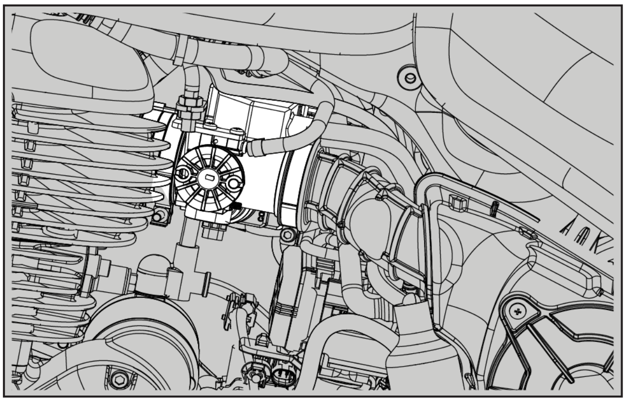
C. DIAGNOSTICS:

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

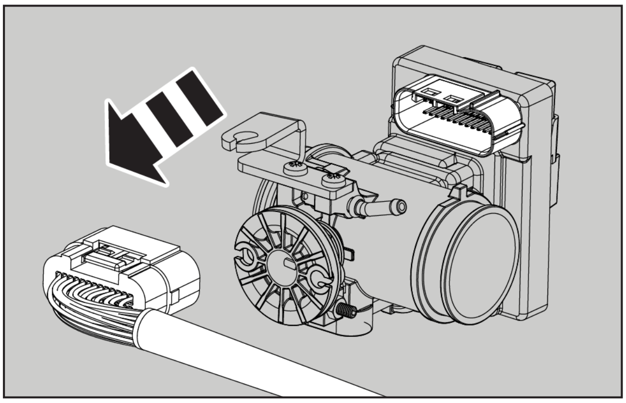
NOTE
• *Please remove the fuel tank from the motorcycle to access the fuel pump coupler*

NOTE
• *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

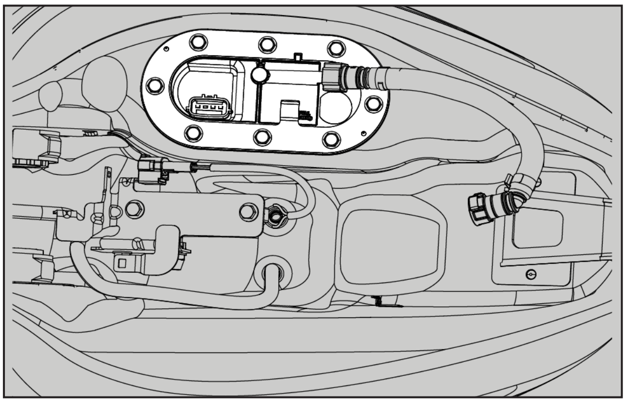
- ECU is located on the throttle body assembly



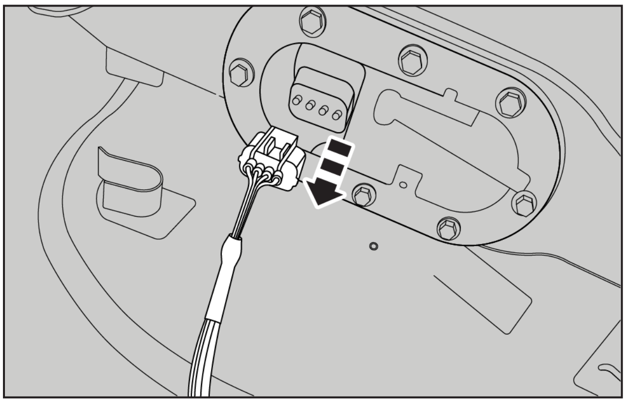
- Disconnect the ECU wiring harness coupler from ECU

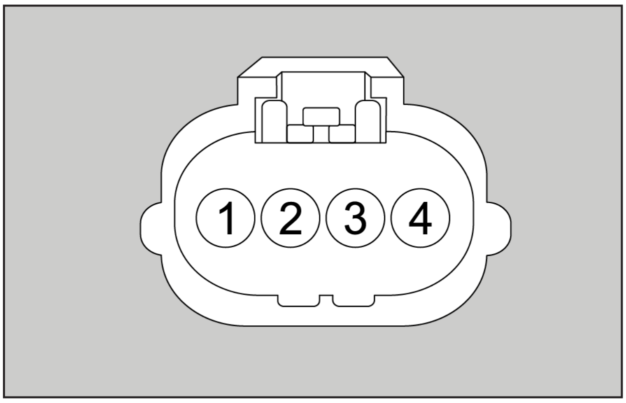


- Fuel pump is located on the fuel tank



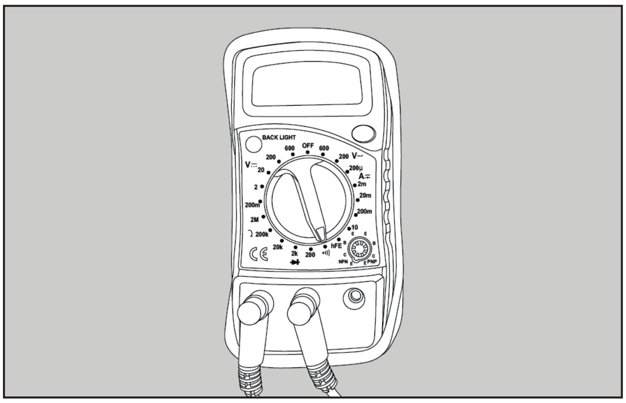
- Disconnect the fuel pump coupler.



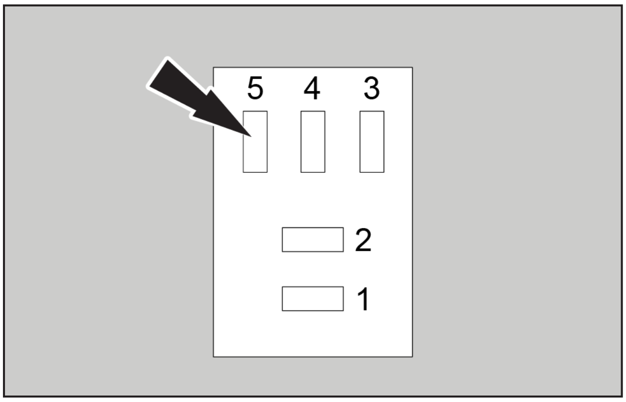


To check Continuity of the Wiring Harness

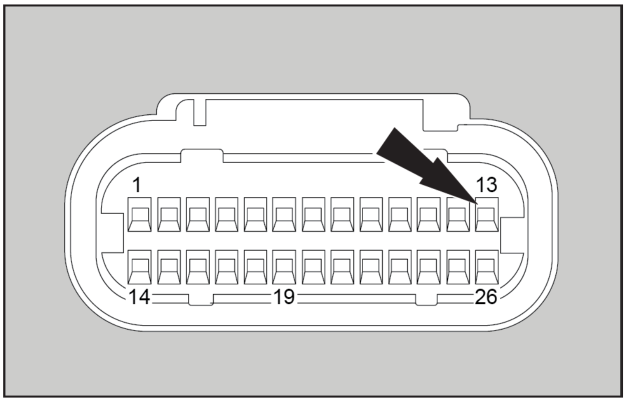
- Keep the multimeter in continuity mode.



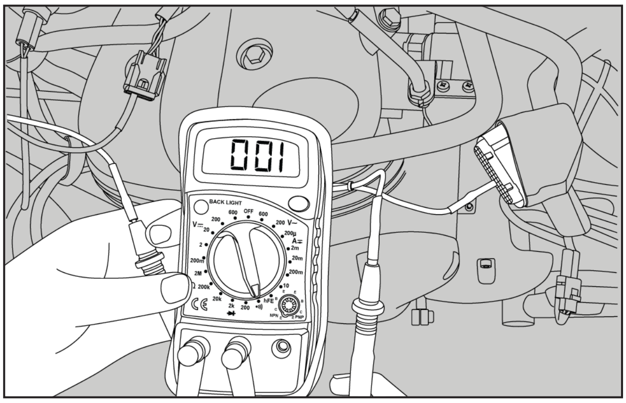
- Using multimeter check pin 5 of the fuel pump relay socket



- Connect 40 series (yellow color) test lead wire with the black tag to pin 13 of the ECU wiring harness coupler.

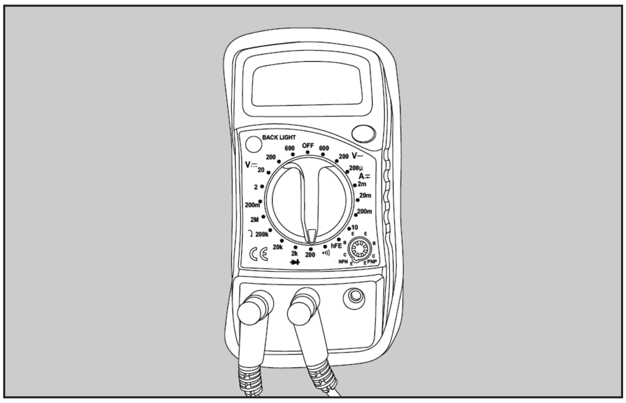


- Check for continuity (Beep sound from multimeter)

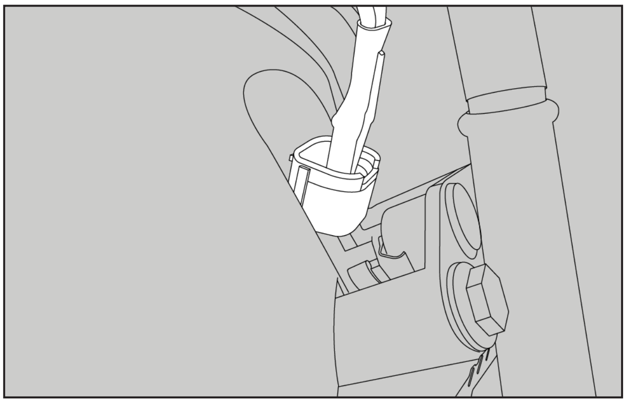


To check the Resistance of Fuel pump

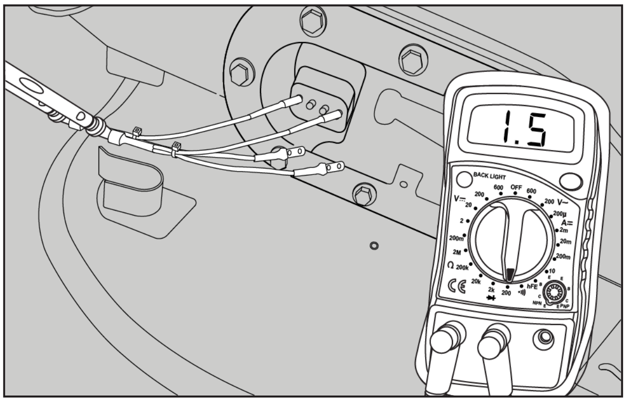
- Keep the multimeter in Resistance mode



- Connect 90 series (Orange black color) Test lead wire with the black tag in Pin 1 and connect 90 series (orange color) test lead wire with the green tag in pin 4 of fuel pump coupler.

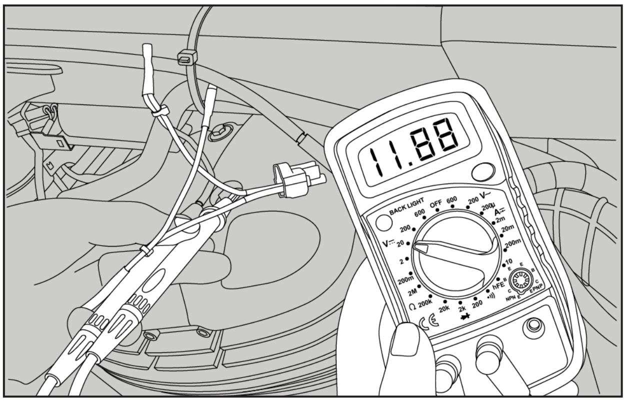


- Connect the multimeter positive probe in pin 1 and negative probe in pin 4. The resistance value is to be 1.0 – 1.8 Ohms



To check the Voltage

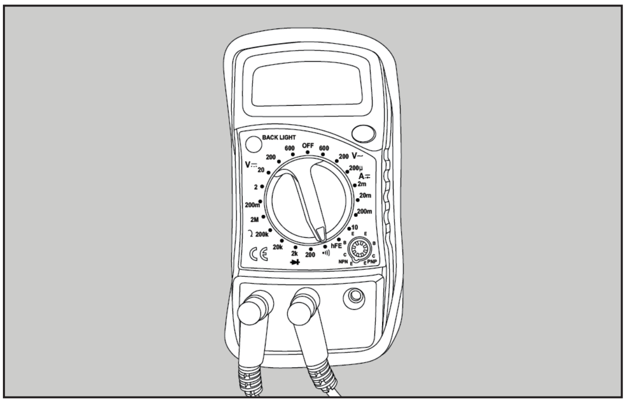
- Connect the multimeter positive probe to pin 1 and negative to body ground in the wiring harness coupler and turn "ON" the ignition. Check the voltage and it should be 12 V in the multimeter



d. Decision Point:

- If the resistance is not within the specified limit (1.0 to 1.8 Ohms), you replace with the Fuel pump
- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.

It is recommended to replace the Fuel pump /ECU / Wiring Harness as per the advice from Royal Enfield only

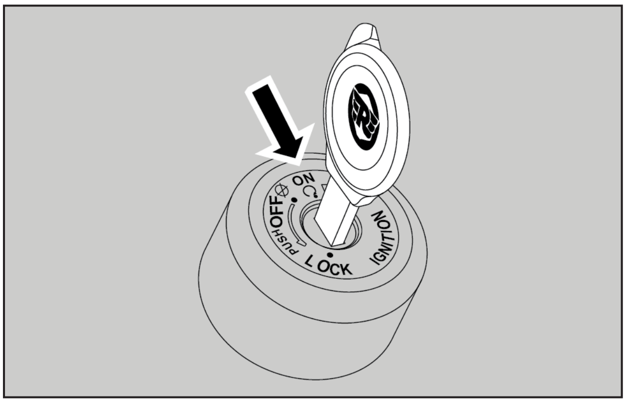


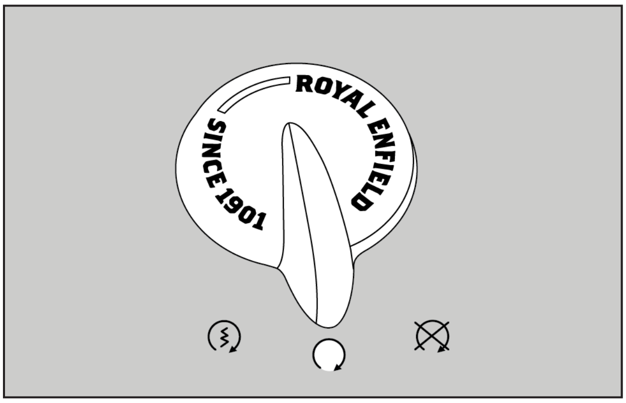
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P0412 - SECONDARY AIR VALVE

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0412	Secondary air valve	Secondary air valve Circuit Low / Open

NOTE
- *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Secondary air valve is also called as Secondary air injection valve

TROUBLE CODE : DTC CODE: P0412

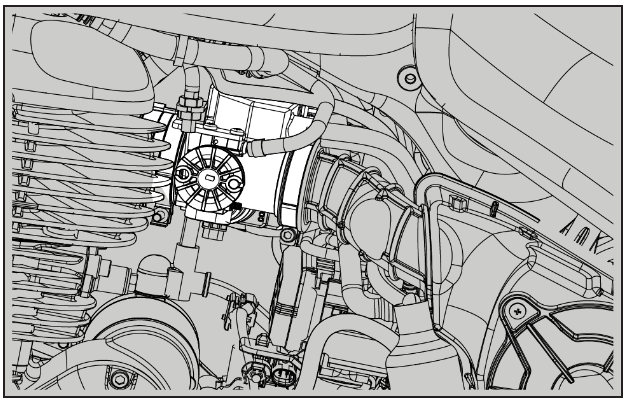
Type of error : Secondary air valve Circuit Low / Open

(i) Information :Secondary air valve circuit fault / Secondary air valve internal fault

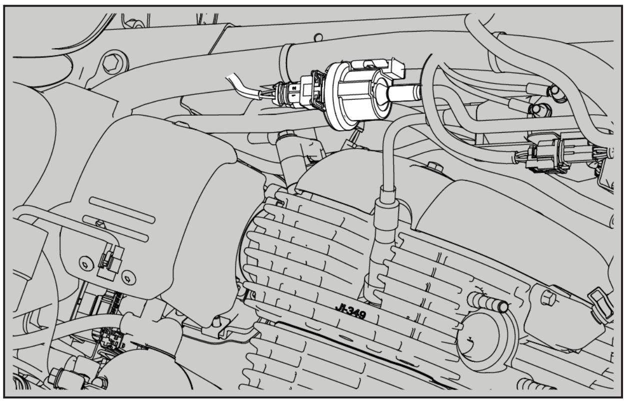
b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

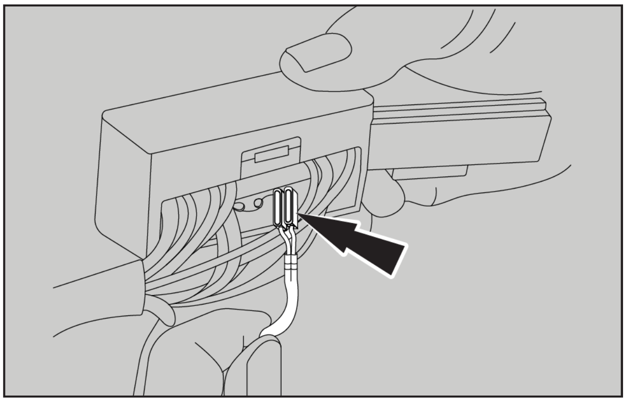
- ECU is located on the throttle body assembly



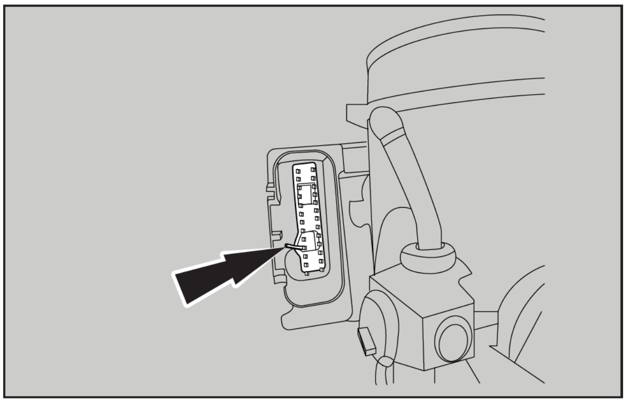
- Secondary air valve is located on the frame under the fuel tank



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers , if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts .If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

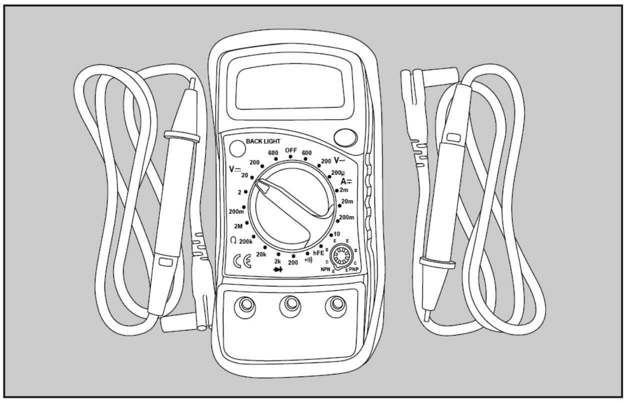
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

3.1 - Using Breakout Box method

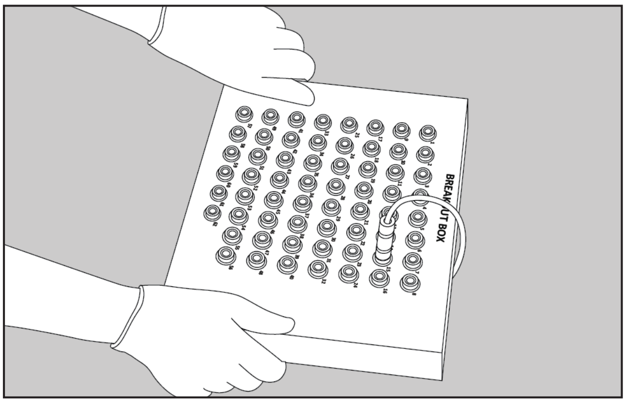
3.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

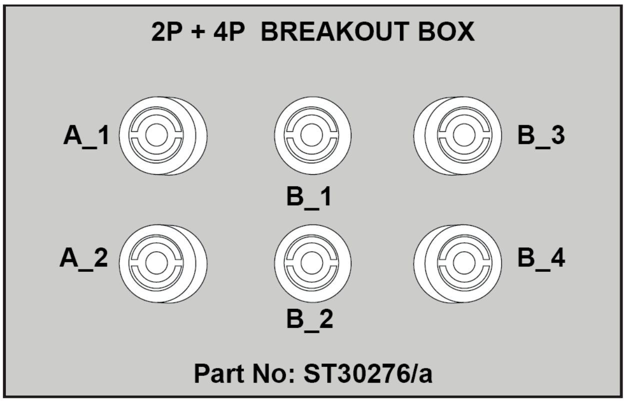
- **Tools Required**
- Multimeter (Universal)



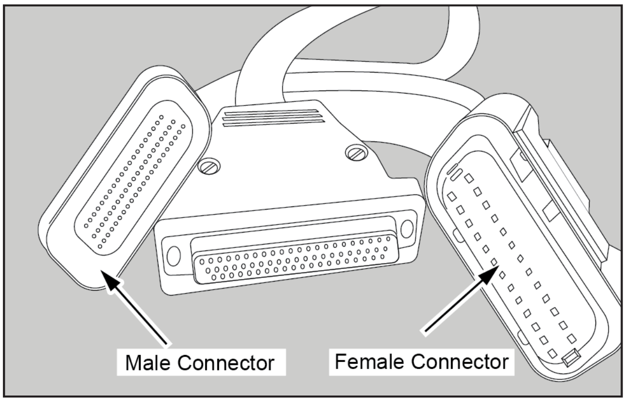
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit



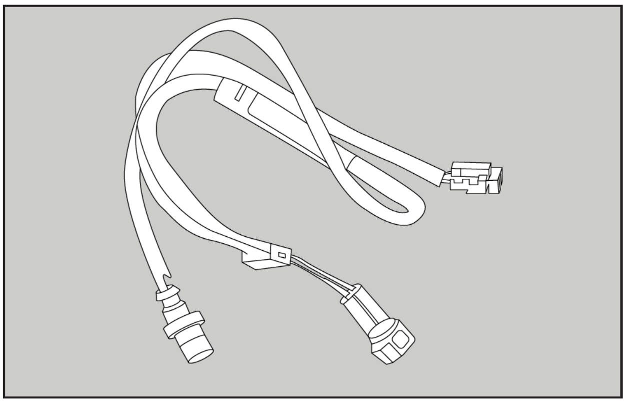
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

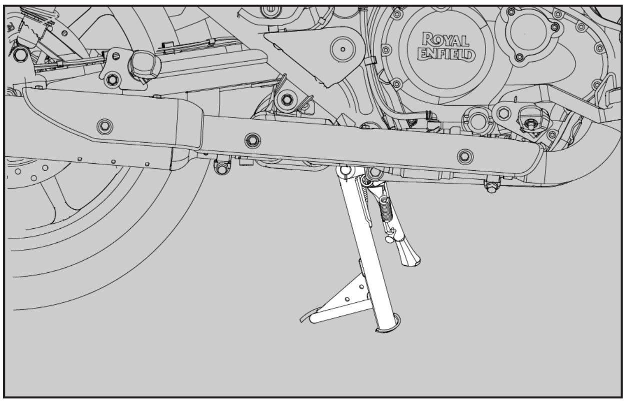

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

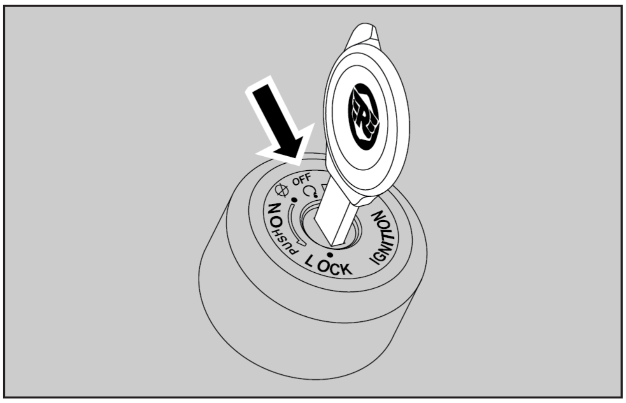


b. Pre-Checks:

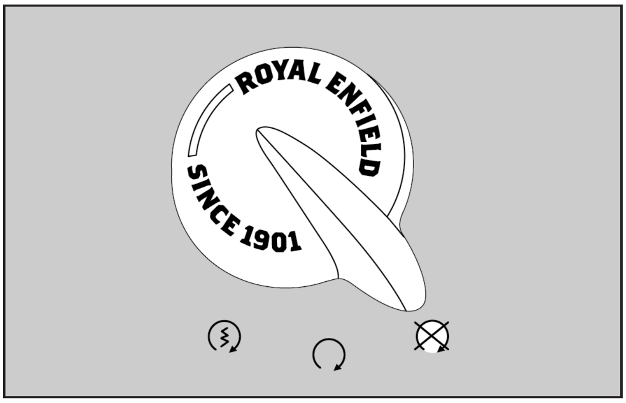
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

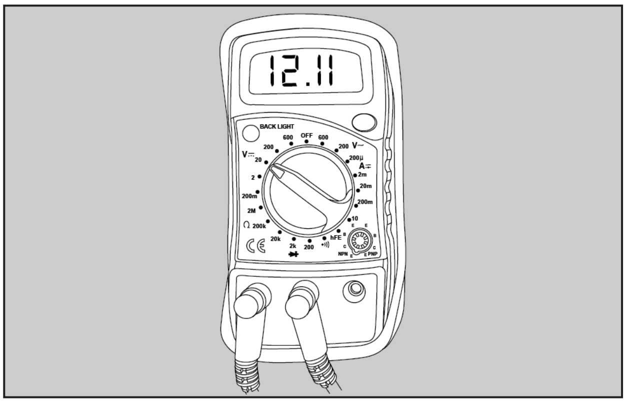
- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

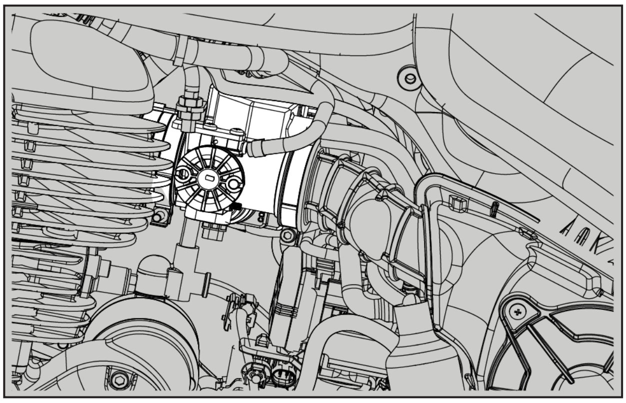
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve coupler*

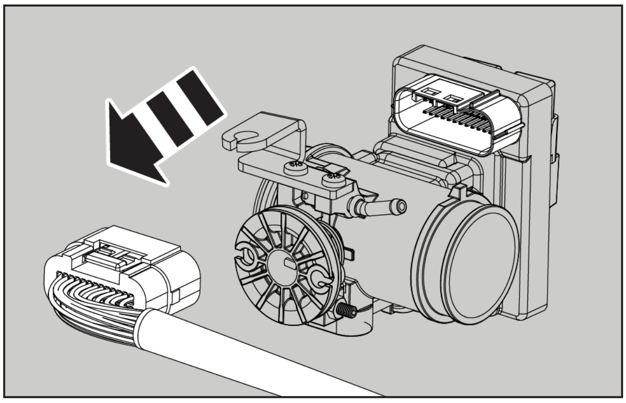
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

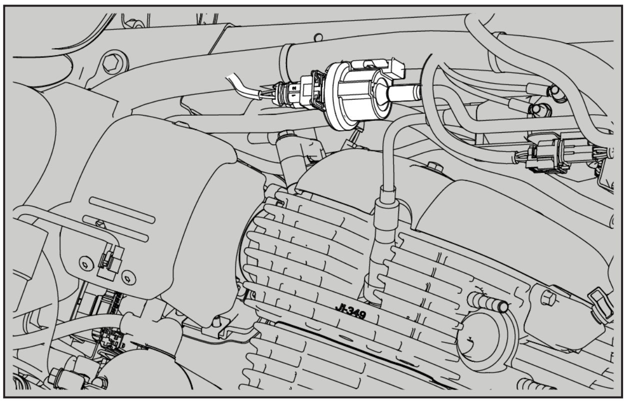
- ECU is located in the throttle body assembly



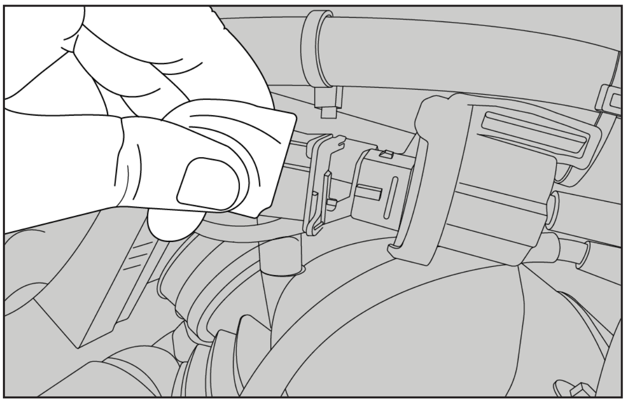
- Disconnect ECU from ECU wiring harness coupler

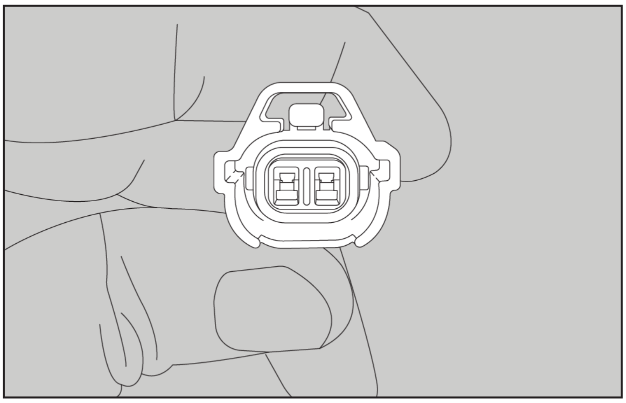


- Secondary air valve is located on the frame under the fuel tank

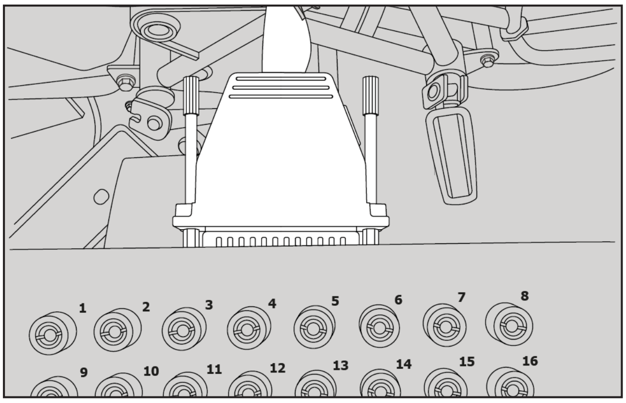


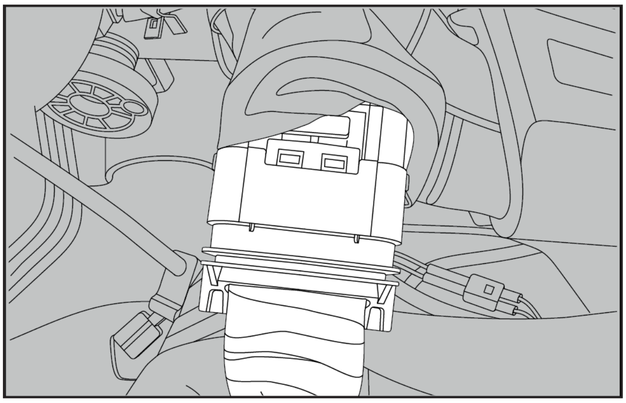
- Disconnect the Secondary air valve coupler.



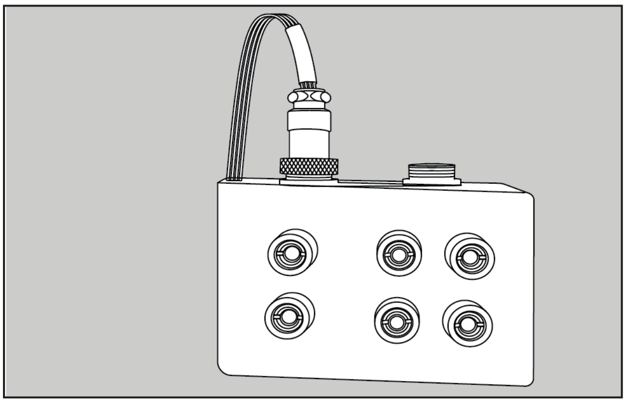


- Connect ECU break out box (62 Pin) kit to Breakout box Harness



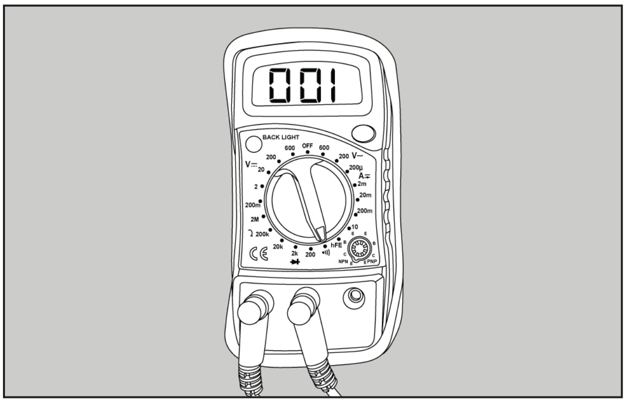


- Connect sensor Breakout Box (2P+4P Pin) to Secondary air valve breakout box harness kit

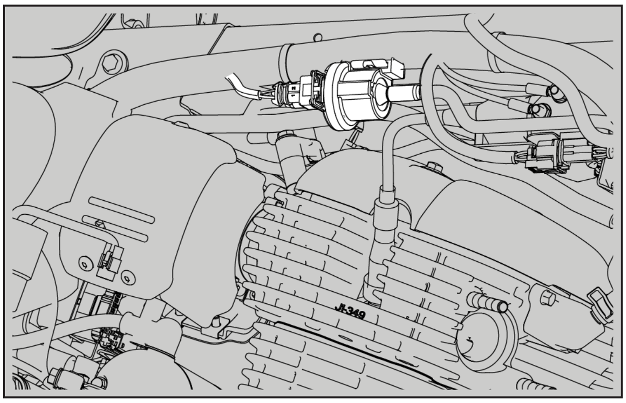


To Check Continuity of Wiring harness

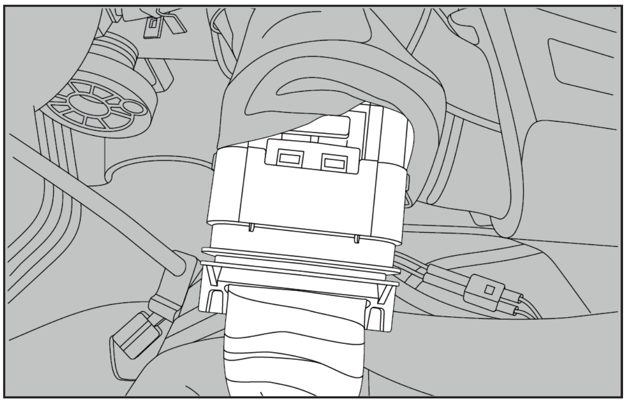
- Keep the multimeter in Continuity mode



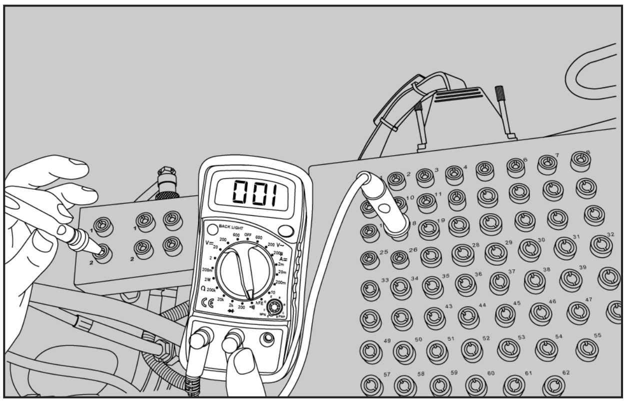
- Connect the Secondary air valve breakout box harness to Secondary air valve wiring harness coupler



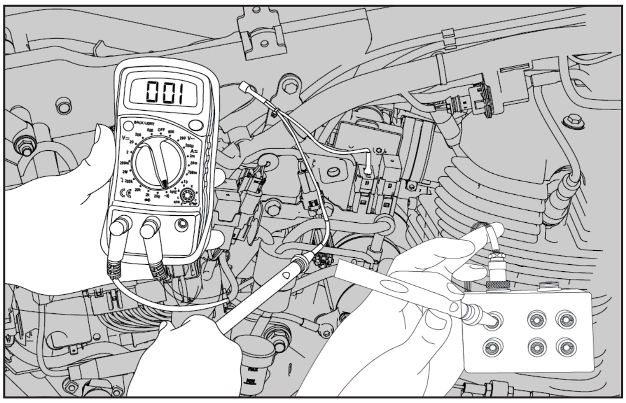
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler

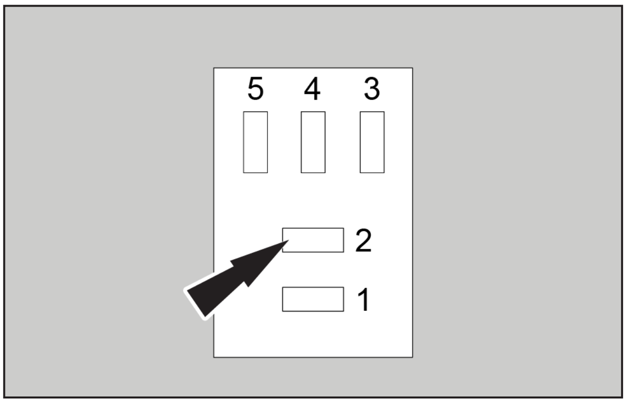


- Keep the positive probe of the multimeter in socket 2 of the sensor break out box and negative probe in socket 9 of ECU breakout box. Check for continuity (Beep sound from multimeter)



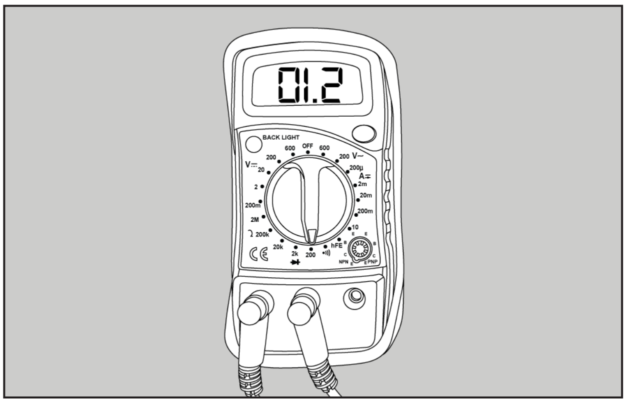
- Keep the positive probe of multimeter in Socket 1 of the Sensor break out box and negative probe in pin 2 of the Power relay and check for continuity (Beep sound from multimeter)



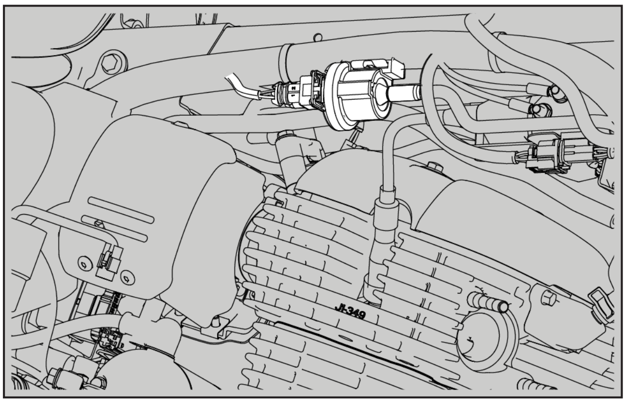


To Check the Resistance

- Keep the multimeter in Resistance mode (200 ohms)



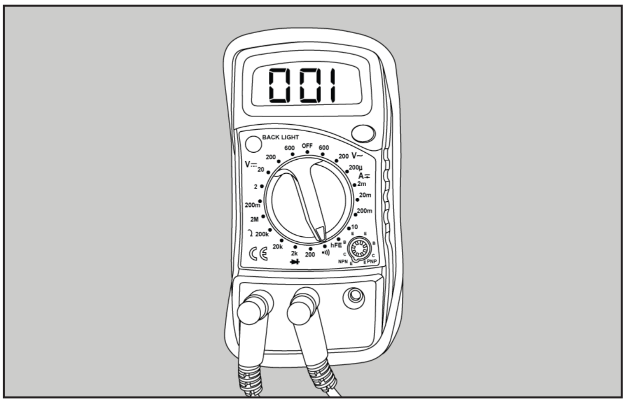
- Connect the Secondary air valve breakout box harness coupler and connect it to the Secondary air valve coupler



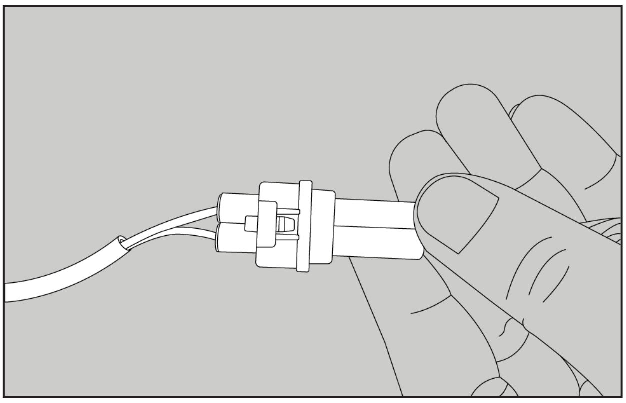
- To check the Resistance value of the Secondary air valve, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box. The resistance value is to be 24.2 to 27.8 Ohms @ 30 5 °C

To Check the Input voltage

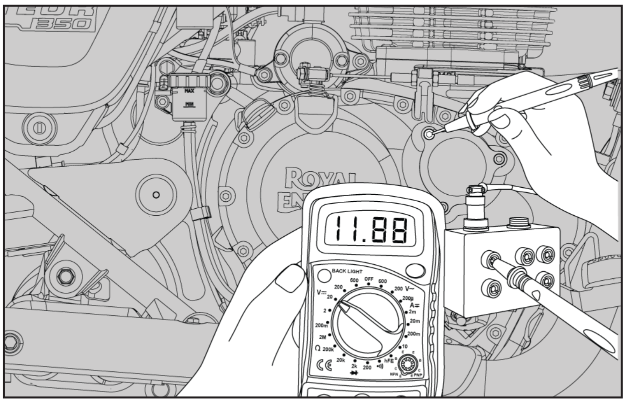
- Keep the multimeter in Voltage mode (20 V)



- Connect the Secondary air valve wiring harness coupler to Secondary air valve breakout harness coupler .



- To check voltage at the wiring kit end, place the positive probe of the multimeter in Socket 1 of the Sensor break out box and place the negative of the multimeter to body ground. Turn "ON"the ignition and kill switch and you will be able to see the voltage of the battery and it should be 12 V in the multimeter.



d. DECISION POINT:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (24.2 to 27.8 Ohms), you replace with Secondary air valve
- If the input voltage is meeting the specified limit and resistance is within the specified limit and if continuity is available then you have to replace the ECU

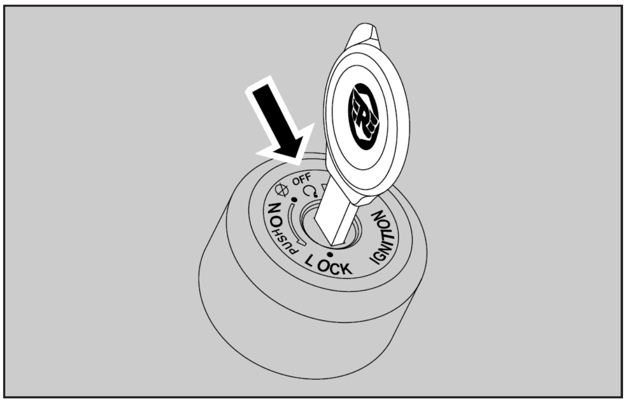
It is recommended to replace the secondary Air Valve /ECU / Wiring Harness as per the advice from Royal Enfield only

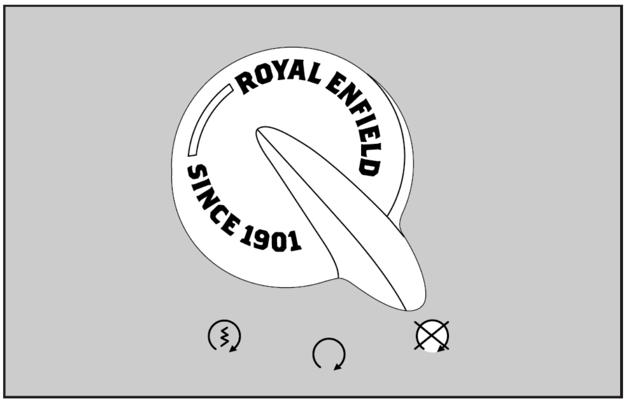
d. DECISION POINT:

⚠ CAUTION

With sensor connector disconnected and ignition is switched “ON”, DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in “ON” Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Switch “OFF” the ignition key and again switch “ON” - repeat this cycle for 3 times till the MIL is “OFF”
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

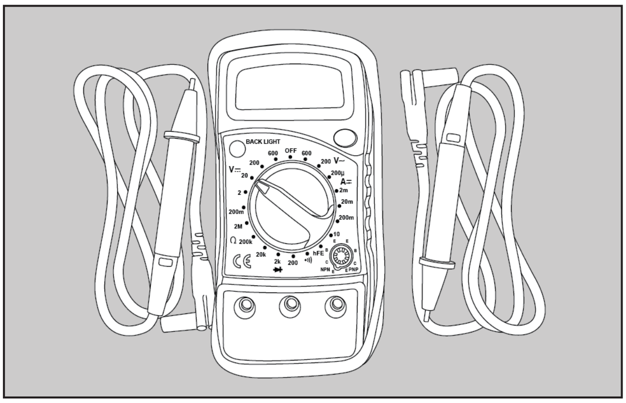
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

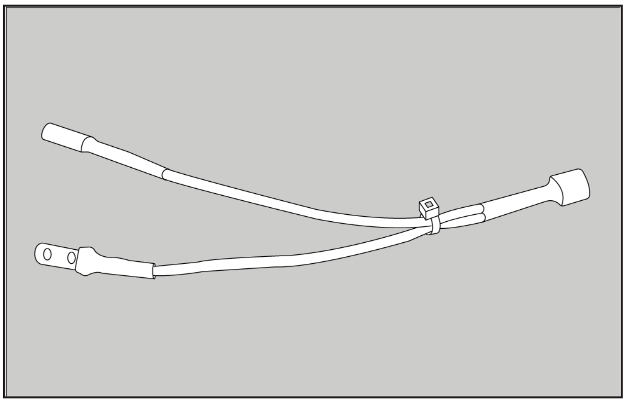
- **Do not disconnect and connect any sensor or ECU with ignition “ON” condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire are inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine etc which might result in short circuit**
- **Please ensure Ignition is turned “OFF” while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition “ON”**
- **With sensor connector disconnected and ignition is switched “ON”, DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the system components.**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting etc.**

Tools Required

- Multimeter (Universal)


BACK LIGHT
600
OFF
600
200
V~
V⎓
200
20
2
200m
2M
Ω 200k
20k
2k
200
hFE
10
200m
20m
2m
A⎓
200µ
NPN
PNP
E
B
C

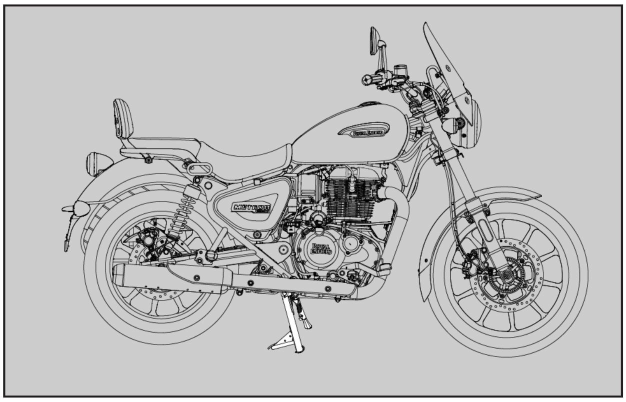
- Probe/Test lead wire(110 SERIES - Black Color wire)
- Probe/Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler



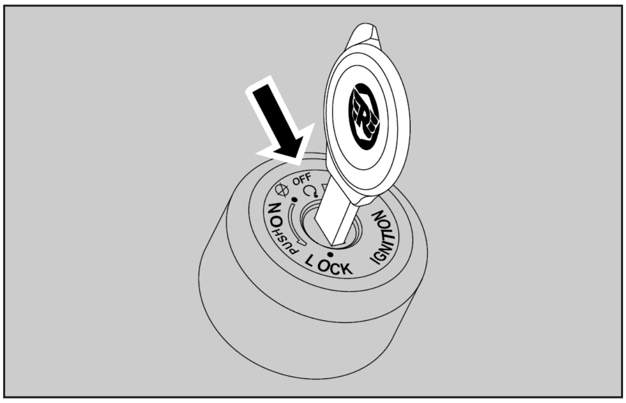
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

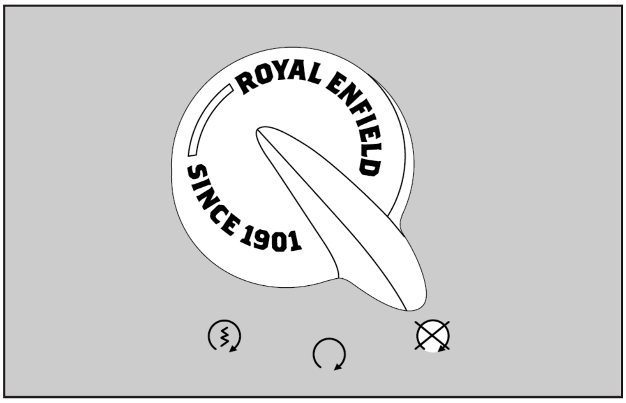
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

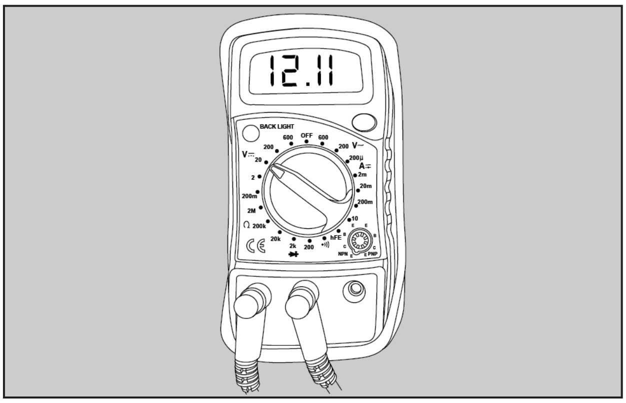

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)


12.11
BACK LIGHT
OFF
600
200
20
2
200m
2M
200k
20k
2k
200
hFE
10
200m
20m
2m
200µ
NPN
PNP

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

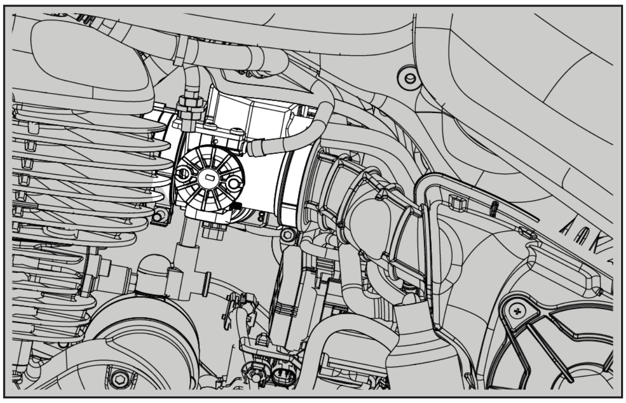
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

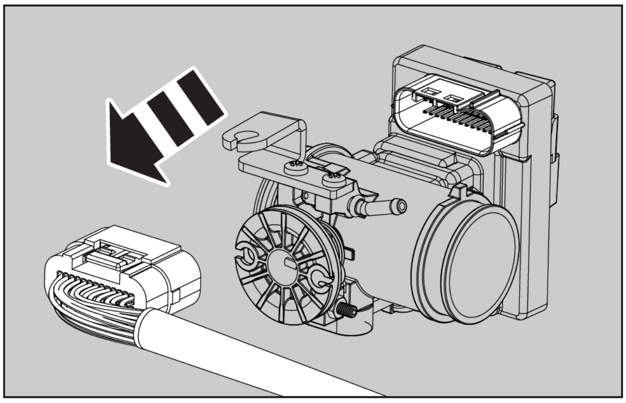
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

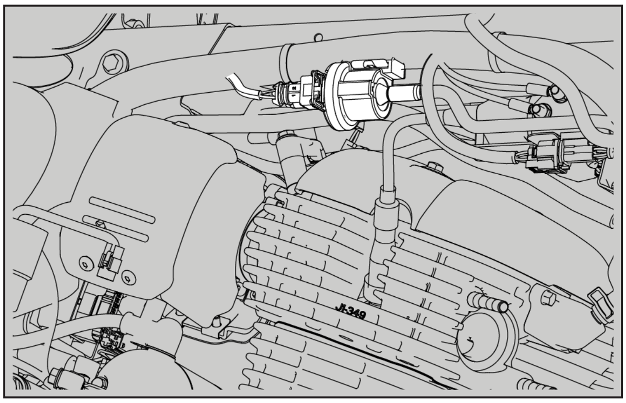
- ECU is located on the throttle body assembly



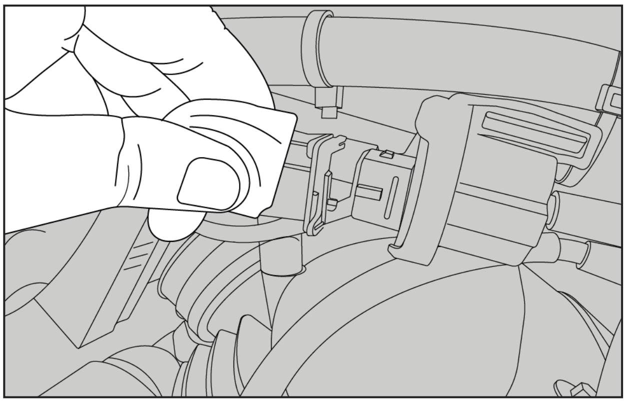
- Disconnect ECU from ECU wiring harness coupler

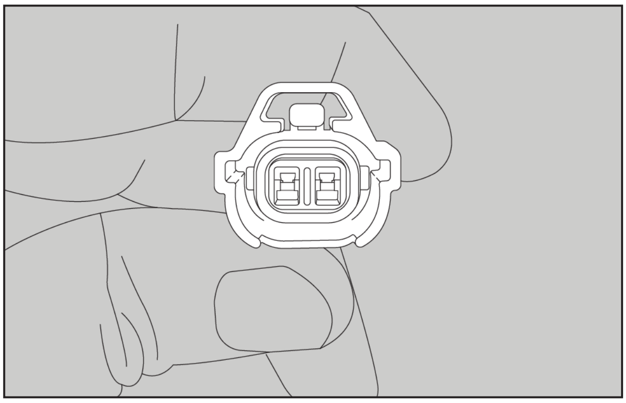


- Secondary air valve is located on the frame under the fuel tank



- Disconnect the Secondary air valve coupler.

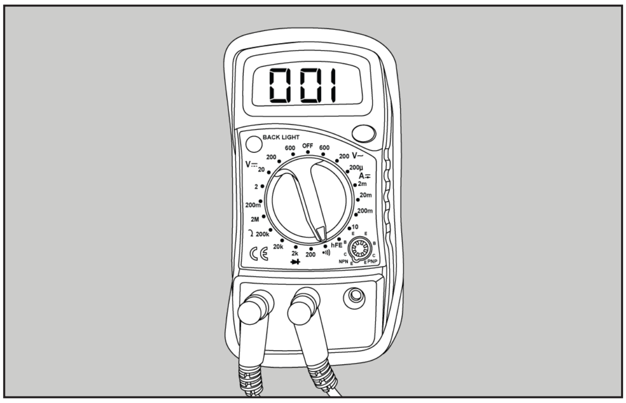




To check the Continuity of the wiring harness

STEP 1

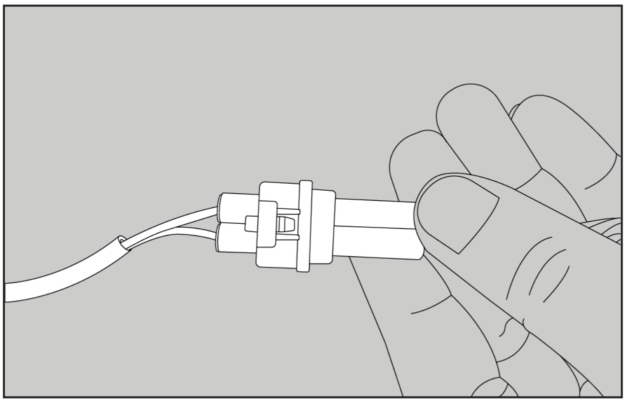
- Keep the multimeter in continuity mode.



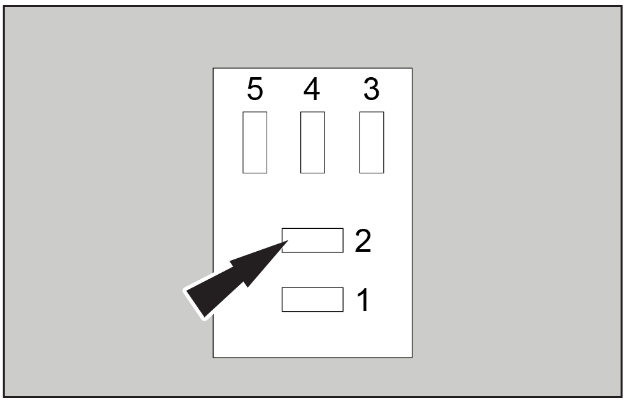
- Connect the Test lead wires 110 series (Black color) in the secondary air valve wiring harness coupler.

110 series (Black color) test lead wire with black tag in Pin 1 of secondary air valve wiring harness coupler

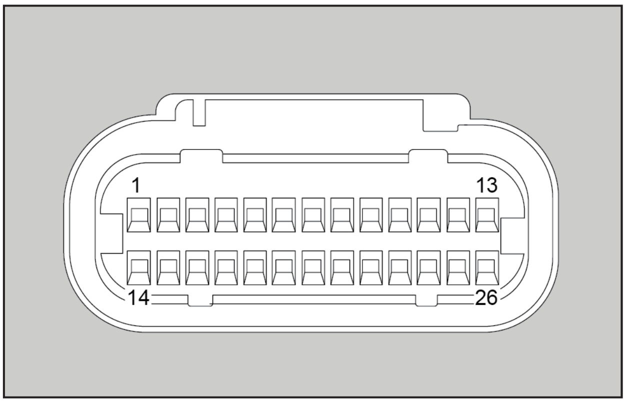
110 series (Black color) test lead wire with red tag in Pin 2 of secondary air valve wiring harness coupler



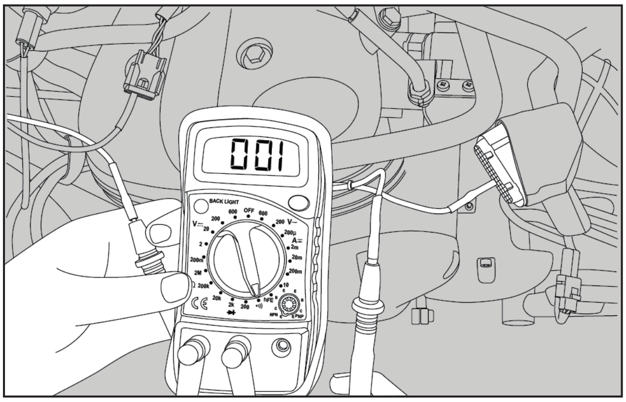
- Keep the multimeter positive probe to Pin 2 (test lead wire with red tag) of the Secondary air valve wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

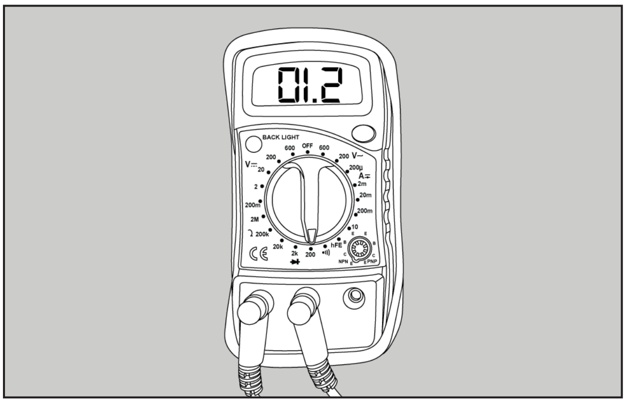


- To check continuity, keep the negative probe in Pin 9 of ECU wiring harness coupler (Test lead wire 40 series yellow colour with black tag) .Check for continuity (Beep sound from multimeter)



To check the Resistance

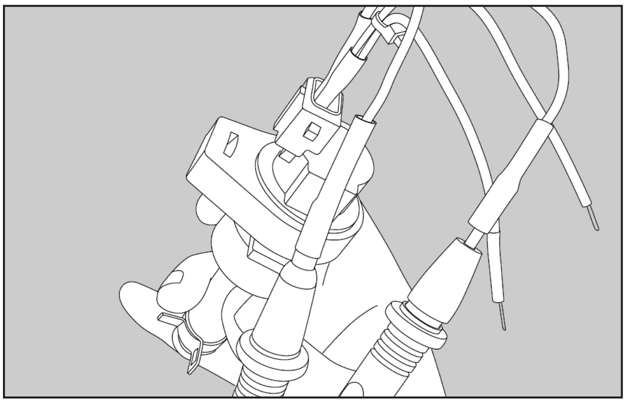
- Keep the multimeter in Resistance mode



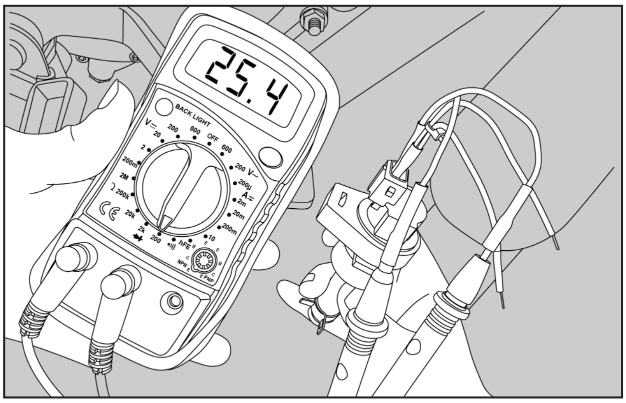
- Connect the Test lead wires 110 series (black colour) in the Secondary air valve coupler.

110 series (black color) Test lead wire with black tag in Pin 1 of Secondary air valve coupler

110 series (black color) Test lead wire with red tag in Pin 2 of Secondary air valve coupler

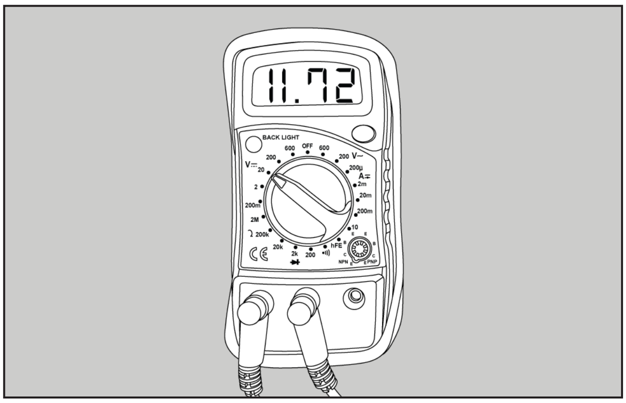


- Keep the multimeter positive probe in Pin 1 (Test lead wire with Black tag) and negative probe in Pin 2 (Test lead wire with red probe). Resistance value to be 24.2 to 27.8 Ohms @ 30 5 °C.

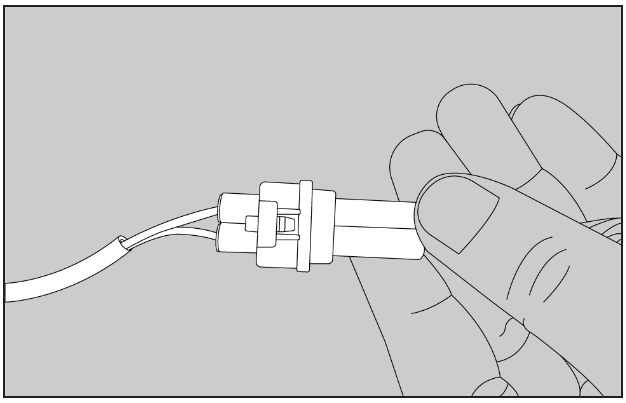


To check the Input voltage

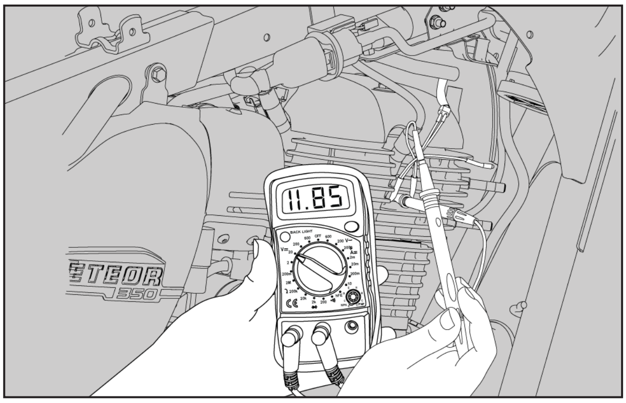
- Keep the multimeter in voltage mode



- Connect the Test lead wires 110 series (black color) in the Secondary air valve wiring harness coupler.
- 110 series (black color) Test lead wire black tag in Pin 1 of secondary air valve wiring harness coupler
- 110 series (black color) test lead wire red tag in Pin 2 of secondary air valve wiring harness coupler



- Connect the multimeter positive probe to pin 1(110 series Test lead wire black colour with Black tag) and negative to body ground in the wiring harness coupler and turn "ON" the ignition and kill switch. The voltage should be equal as the battery voltage (12 V).



d. Decision Point:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (24.2 to 27.8 Ohms @ 30 5 °C), you replace with Secondary air valve
- If the voltage is meeting the specified limit and if continuity is available you have to replace the ECU.

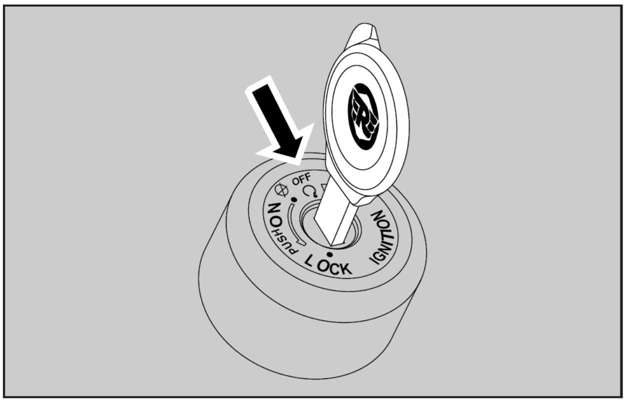
It is recommended to replace the secondary Air Valve /ECU / Wiring Harness as per the advice from Royal Enfield only

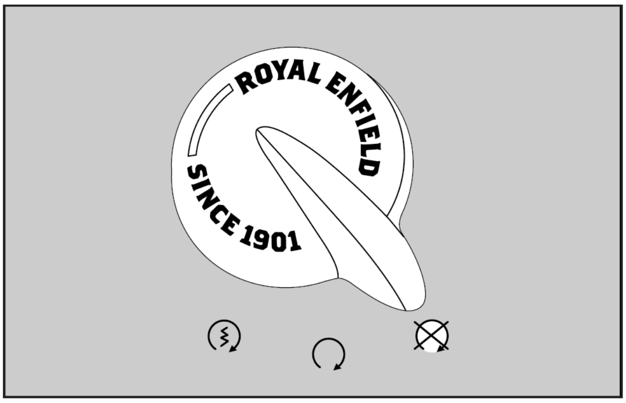
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

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P0412 - SECONDARY AIR VALVE DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0444	Canister purge solenoid	Canister purge solenoid Circuit Low / Open

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Canister purge solenoid is also called a Canister purge valve

TROUBLE CODE : DTC CODE: P0444

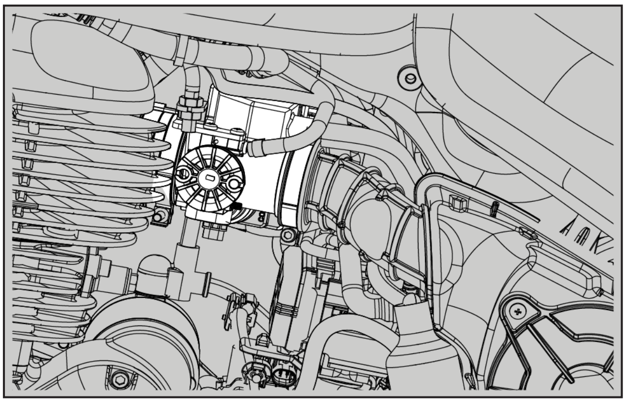
Type of error : Canister purge solenoid circuit Low / Open

(i) Information: Canister purge solenoid circuit fault / Canister purge solenoid internal fault

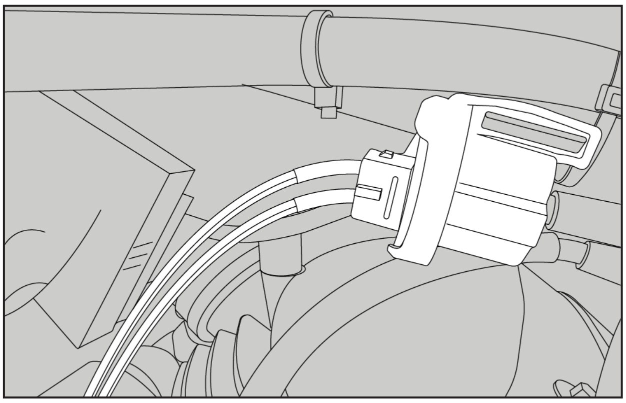
b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

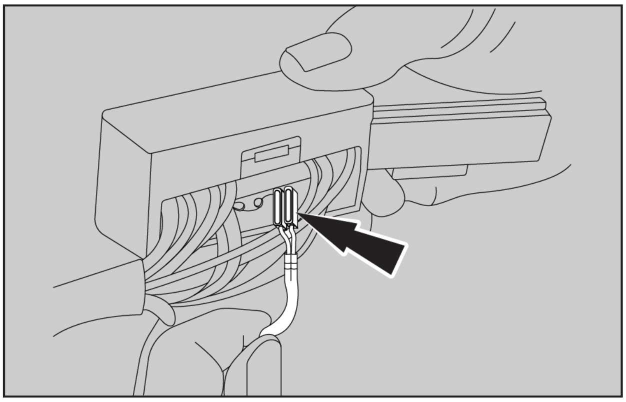
- ECU is located on the Throttle body Assembly



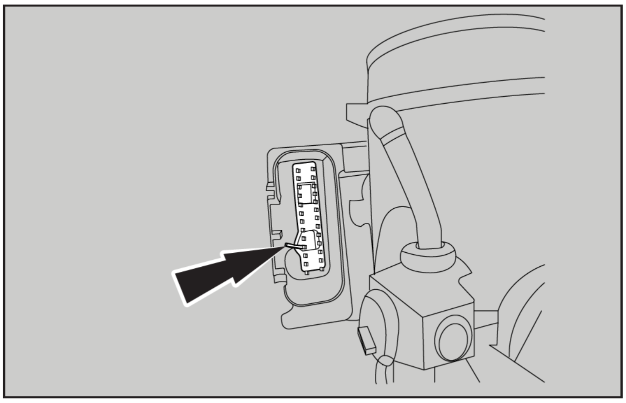
- Canister purge solenoid is located on the frame below the fuel tank



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

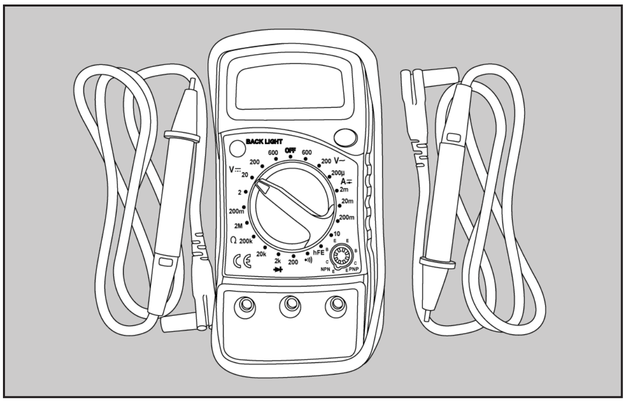
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

3.1 - Using Breakout Box method

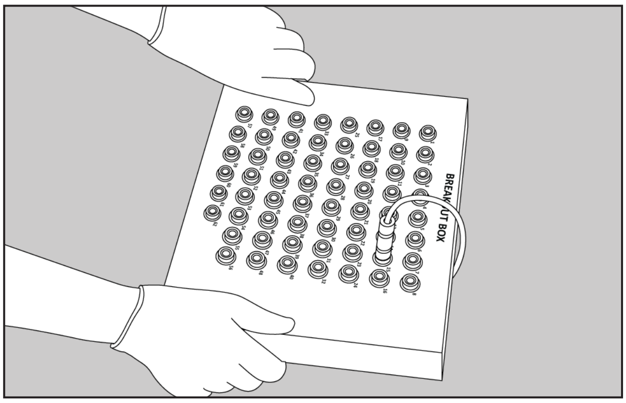
3.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

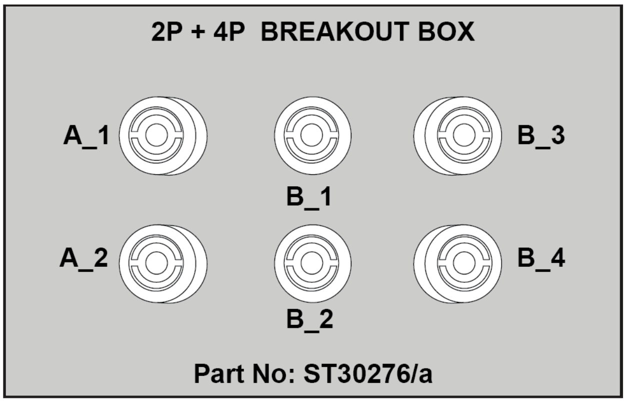
- **Tools Required**
- Multimeter (Universal)



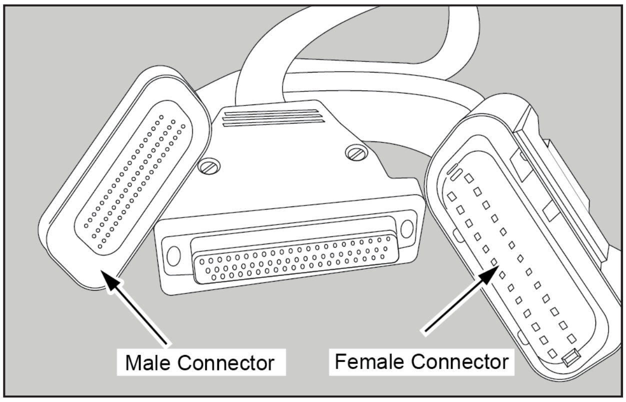
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

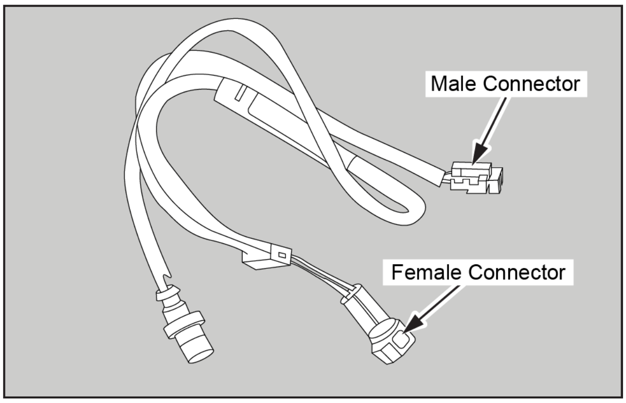
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

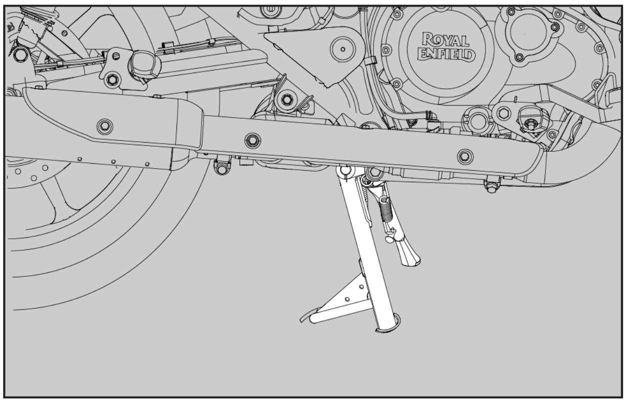

Male Connector
Female Connector

- SAI /Canister purge valve (2P) -Sensor breakout box harness-ST30924/A

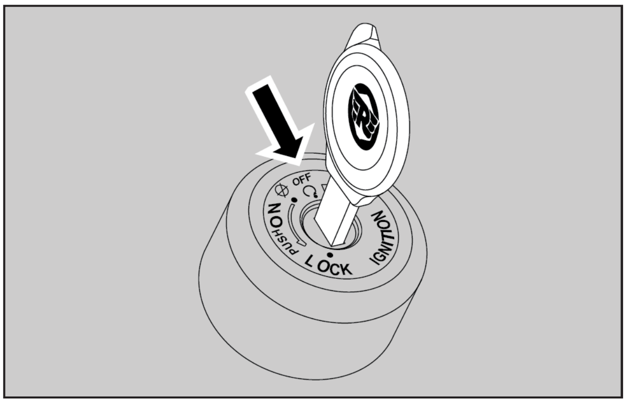

Male Connector
Female Connector

b. Pre-Checks:

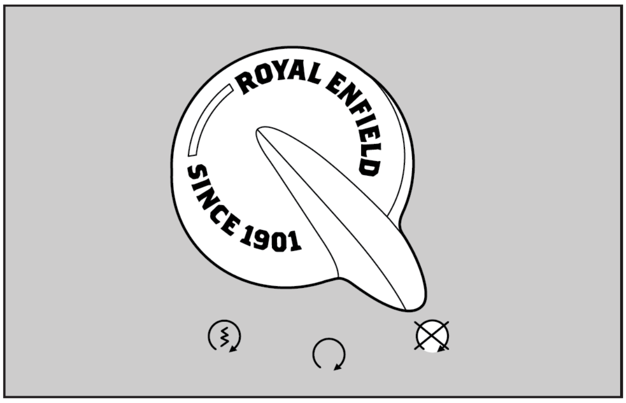
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
ON
PUSH
LOCK
IGNITION

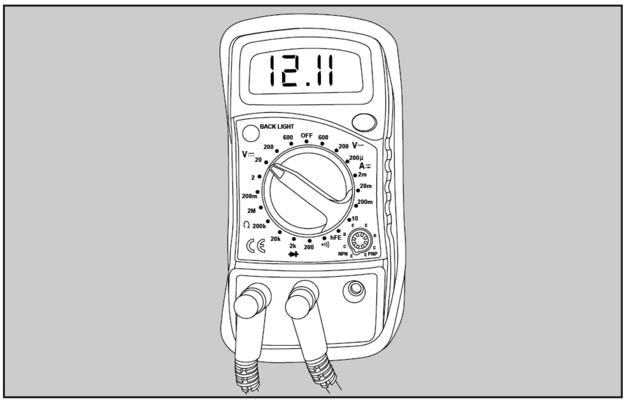
- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

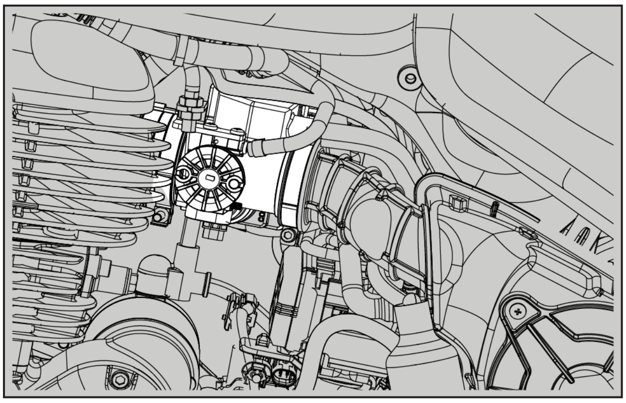
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Canister purge solenoid coupler*

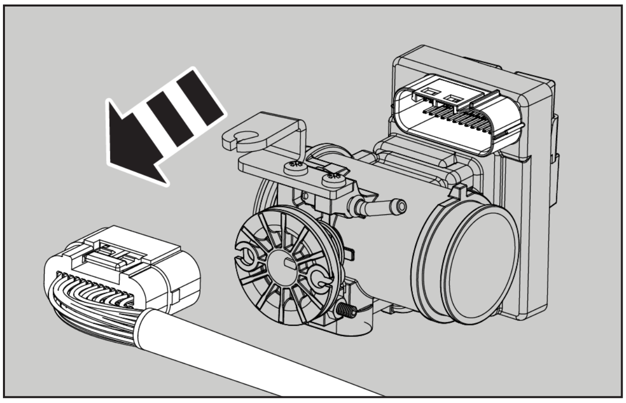
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

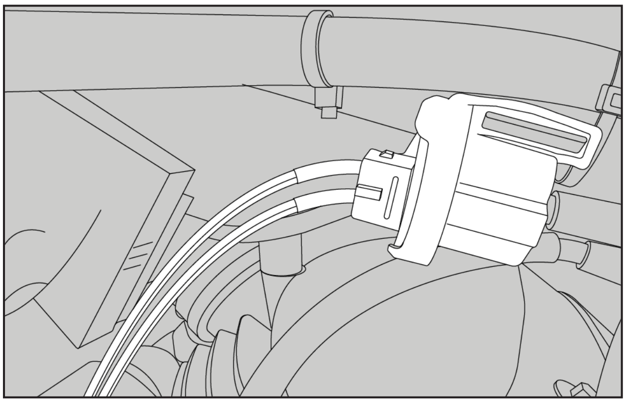
- ECU is located in the throttle body assembly



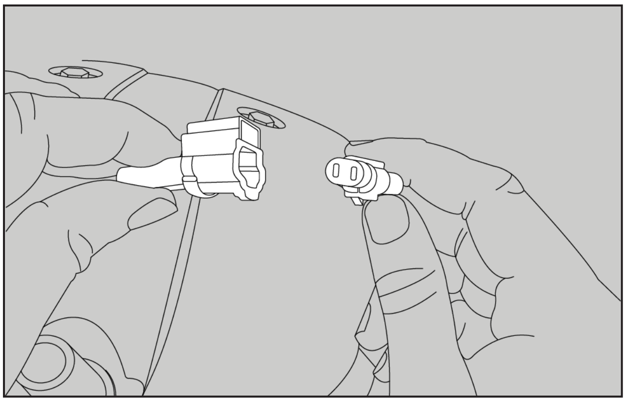
- Disconnect ECU from ECU coupler.



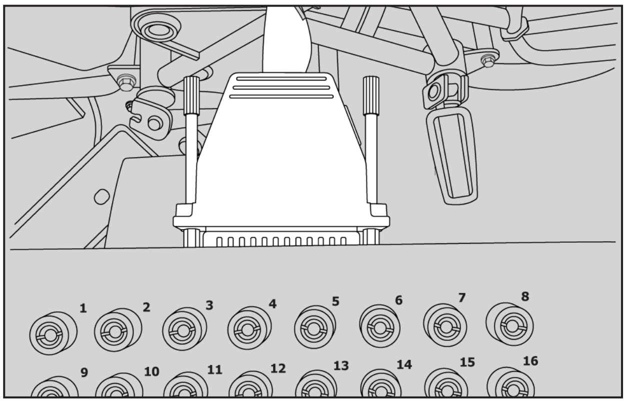
- Canister purge solenoid is located on the frame below the fuel tank



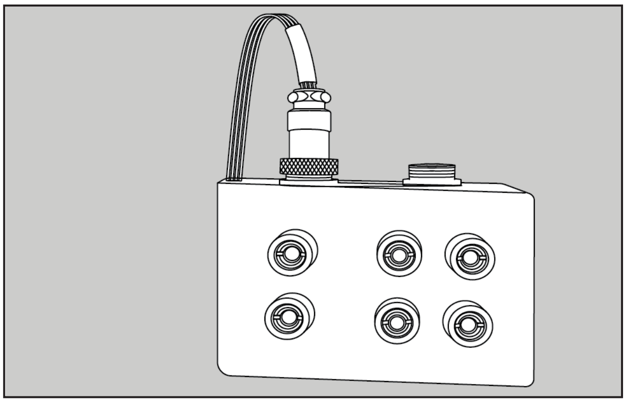
- Disconnect Canister purge solenoid coupler.



- Connect ECU break out box (62 Pin) kit to Breakout box Harness

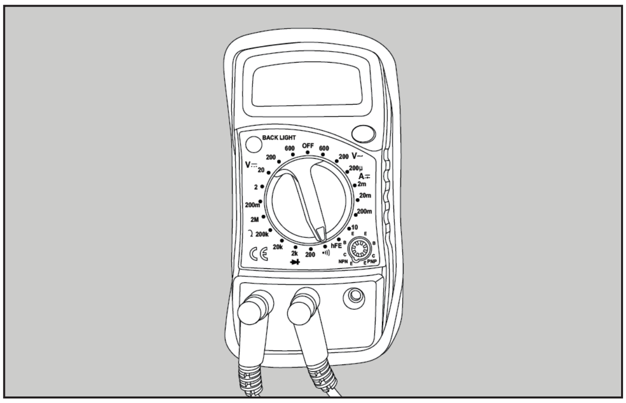


- Connect Breakout Box (2P+4P Pin) to Canister purge solenoid breakout box harness kit

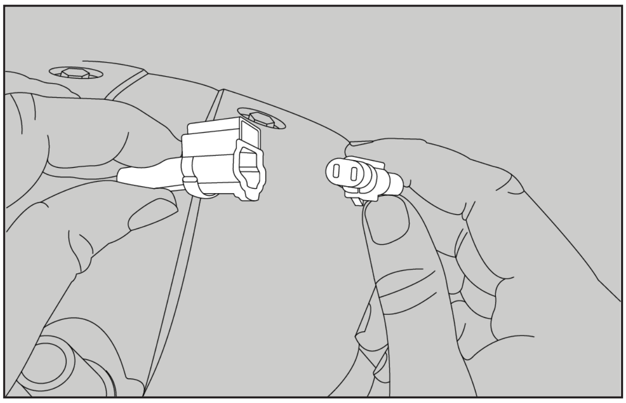


To Check Continuity of Wiring harness

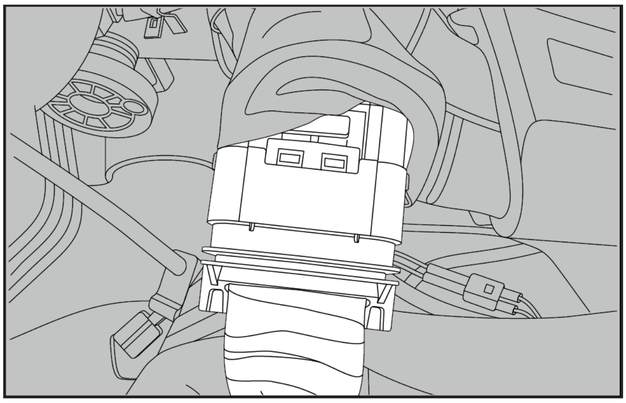
- Keep the multimeter in Continuity mode



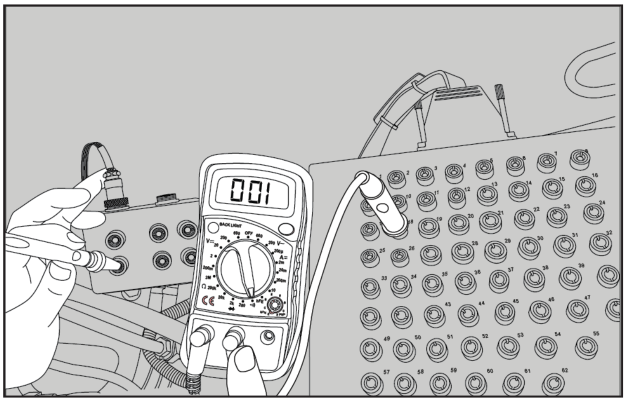
- Connect the Sensor breakout box harness to Canister purge solenoid wiring harness coupler



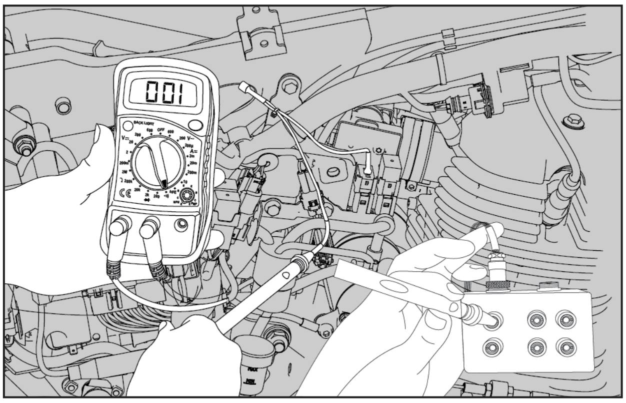
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler

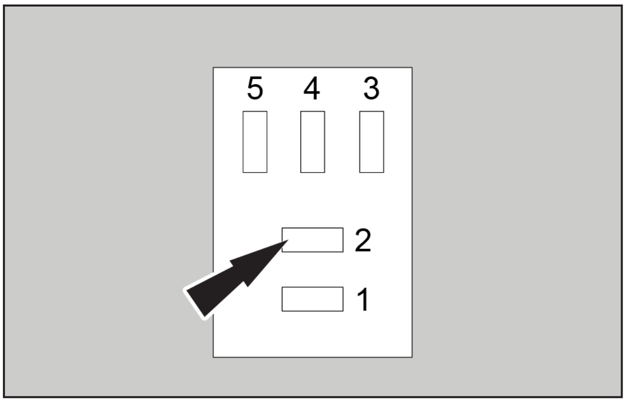


- To check continuity, keep the positive probe of the multimeter in socket 2 of the Canister purge valve breakout box and negative probe in socket 18 of the ECU breakout box. Check for continuity (Beep sound from multimeter)



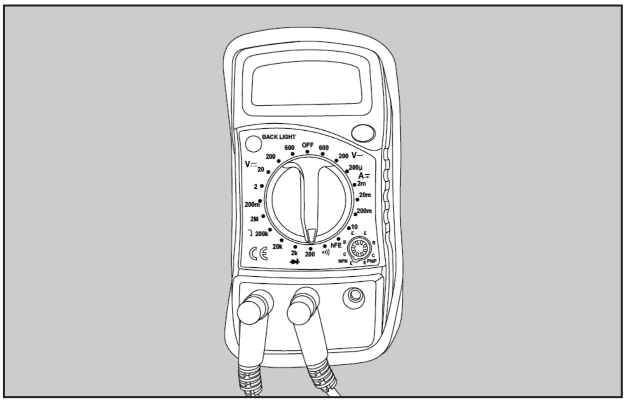
- Keep the positive probe of multimeter in socket 1 of the Sensor breakout box and negative probe in pin 2 of the Power relay and check for continuity.



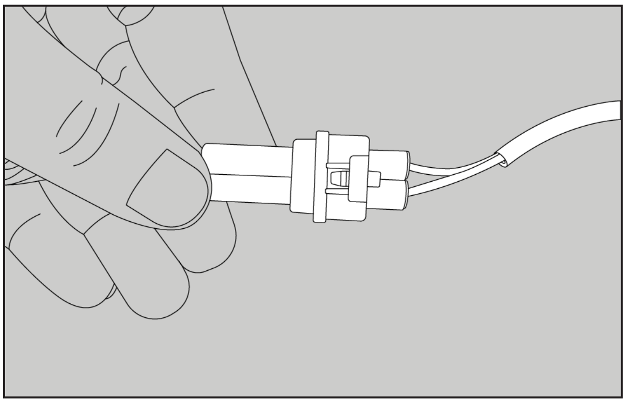


To Check the Resistance

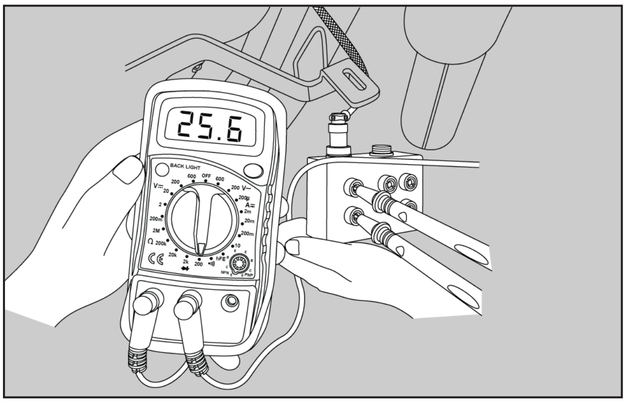
- Keep the multimeter in Resistance mode



- Connect the Canister purge solenoid breakout box harness to Canister purge solenoid coupler

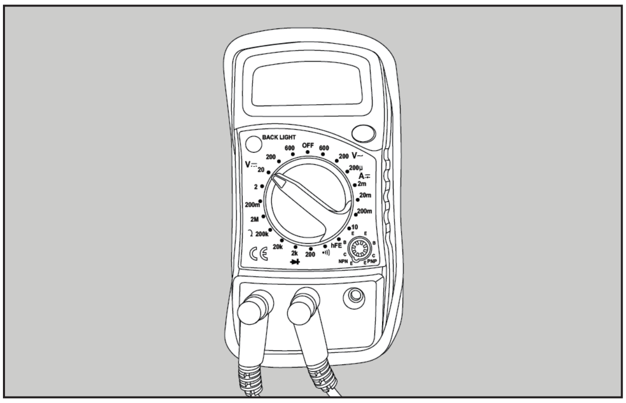


- To check the Resistance value of the Canister purge solenoid, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Canister purge valve breakout box. The resistance value is to be 24 to 28 Ohms @30+5°C.

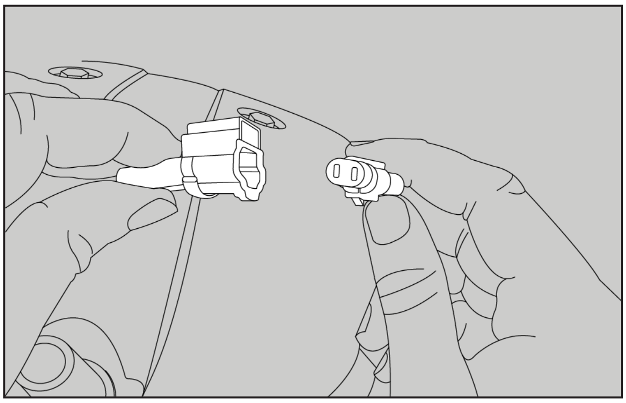


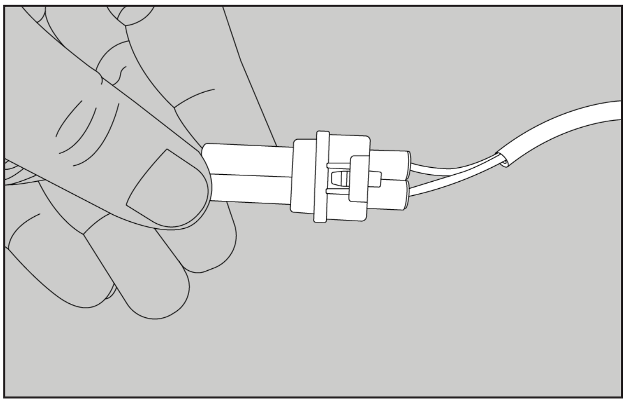
To Check the Input voltage

- Keep the multimeter in Voltage mode (20 V)

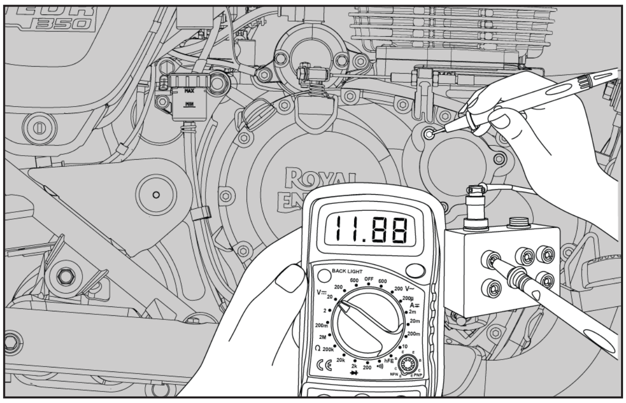


- Connect the canister purge breakout box wiring harness to Canister purge solenoid wiring harness coupler .





- To check voltage at the wiring kit end, place the positive probe of the multimeter in Socket 1 of the Sensor breakout box and place the negative of the multimeter to body ground. Turn "ON" the ignition and kill switch and you will be able to see the voltage of the battery and it should be 12 V in the multimeter.



d. DECISION POINT:

- If there is no continuity between ECU and canister purge valve you may replace the Wiring harness.
- If the resistance is not within the specified limit (24 to 28 Ohms), you replace with a Canister purge solenoid
- If the input voltage is meeting the specified limit, if continuity is available and resistance is reaching the specified limits, then you have to replace the ECU.

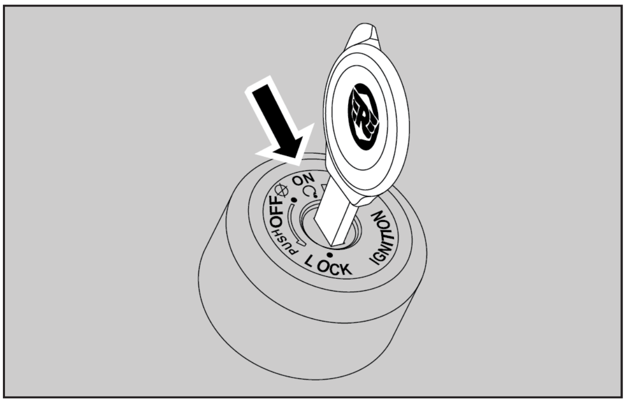
It is recommended to replace the canister purge solenoid /ECU / Wiring Harness as per the advice from Royal Enfield only

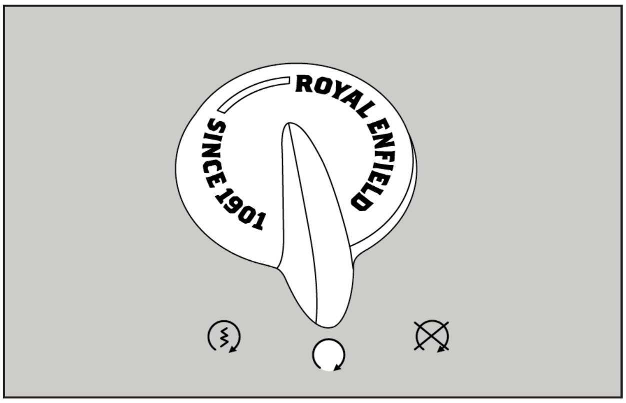
d. DECISION POINT:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

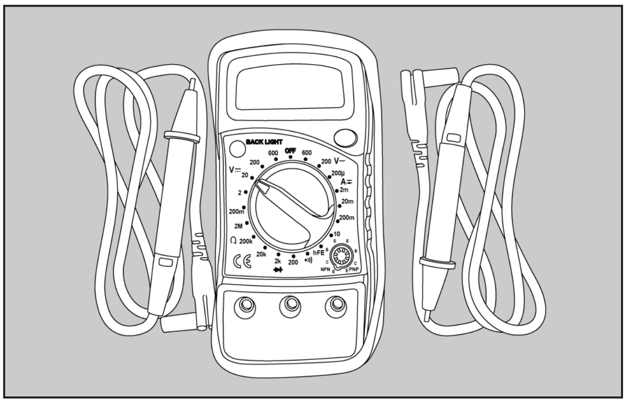
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting etc.**

Tools Required

- Multimeter (Universal)

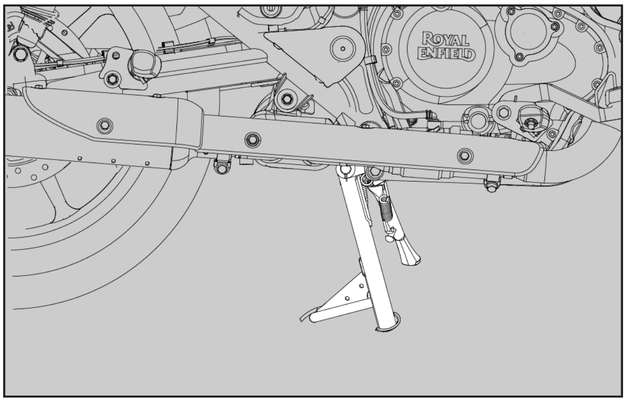

BACK LIGHT
OFF
600
600
200
200
V
20
2
200m
2M
200k
20k
2k
200
hFE
200µ
A
2m
20m
200m
10
NPN
PNP

- Probe/Test lead wire(110 SERIES - Black Color wire)
- Probe/Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler

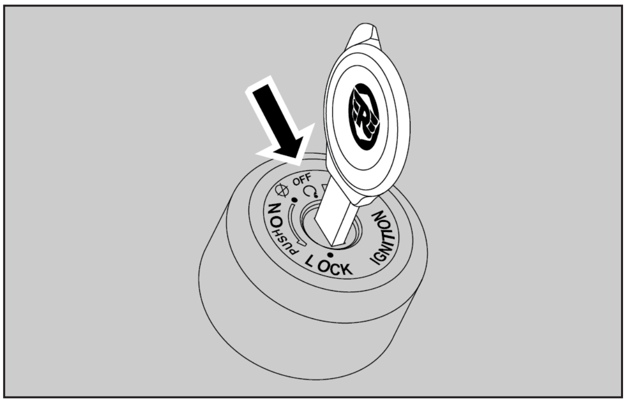
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

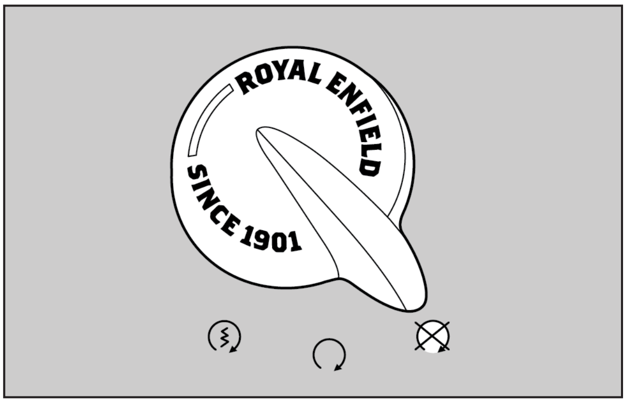
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

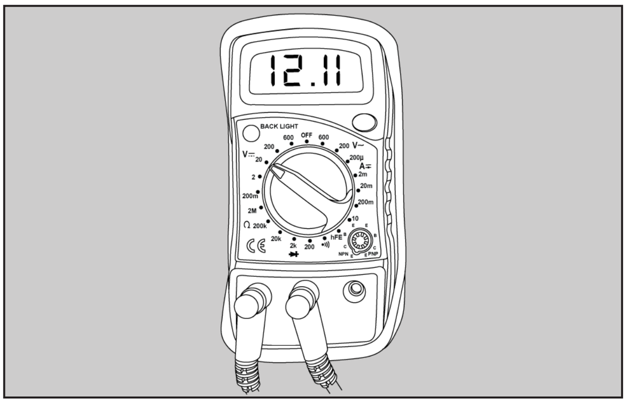


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

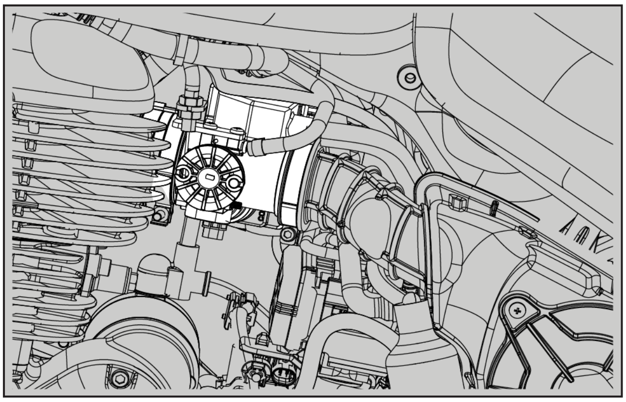
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

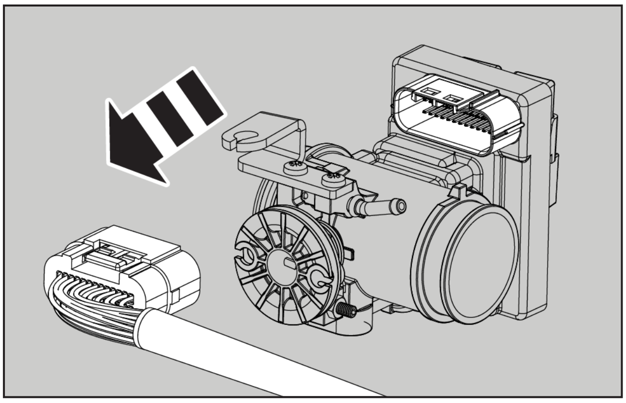
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

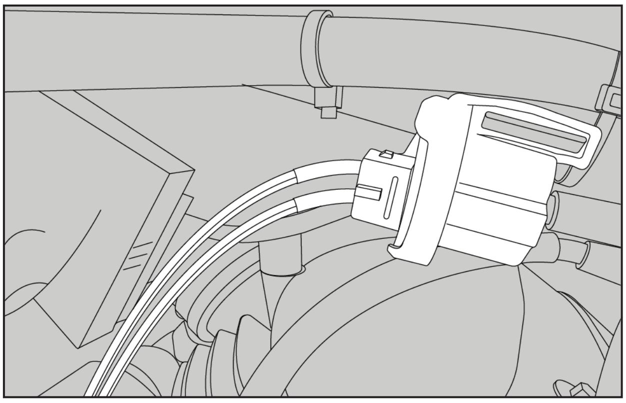
- ECU is located on the throttle body assembly



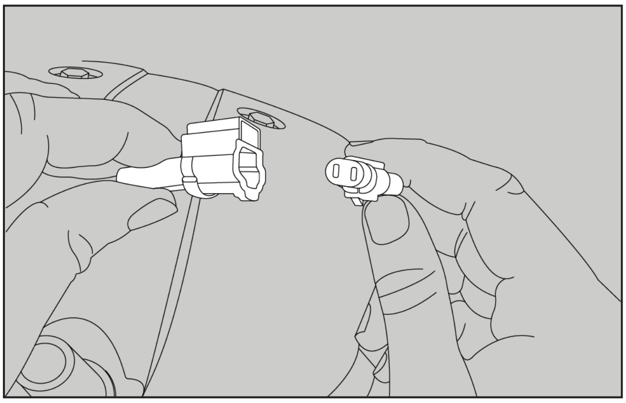
- Disconnect ECU from ECU wiring harness coupler



- Canister purge solenoid is located on the frame below the fuel tank



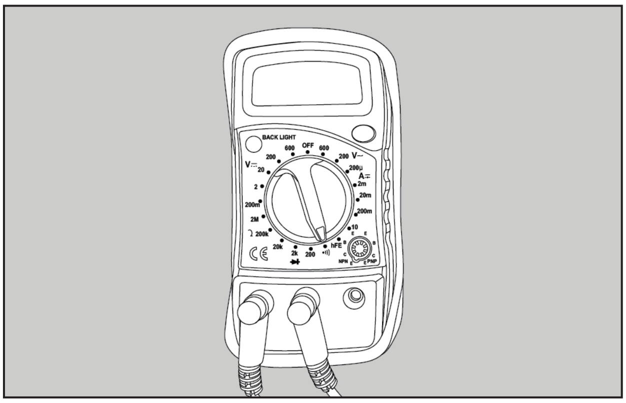
- Disconnect Canister purge solenoid coupler.



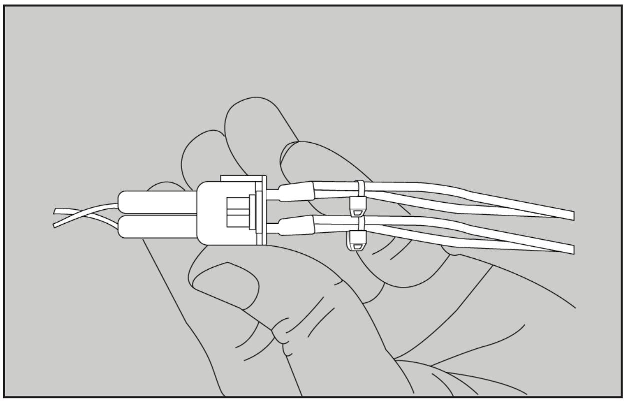
To check the Continuity of the wiring harness

STEP 1

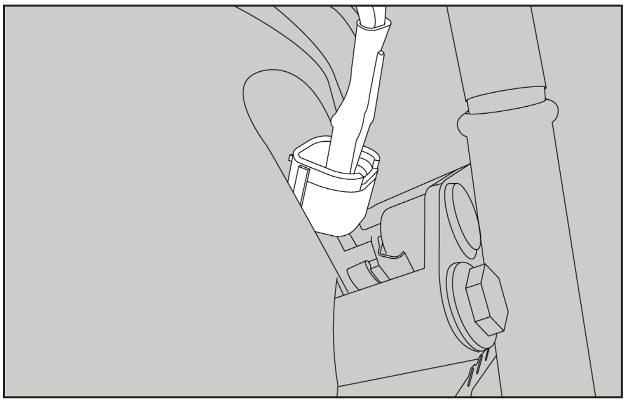
- Keep the multimeter in continuity mode.



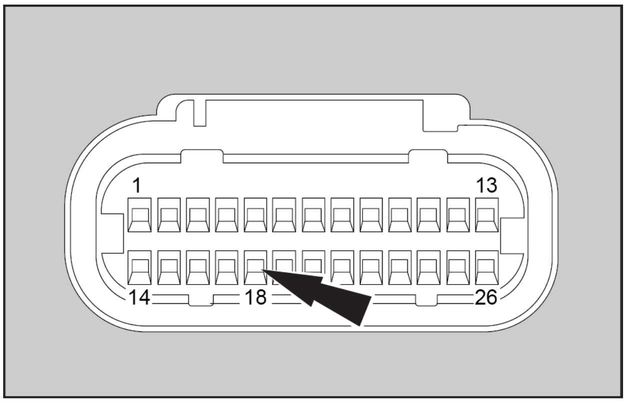
- Connect the Test lead wires 110 series Black colour in the Canister purge solenoid wiring harness coupler.
- 110 series (Black color) test lead wire with black tag in Pin 1 of canister purge solenoid wiring harness coupler
- 110 series (Black color) test lead wire with red tag in Pin 1 of canister purge solenoid wiring harness coupler



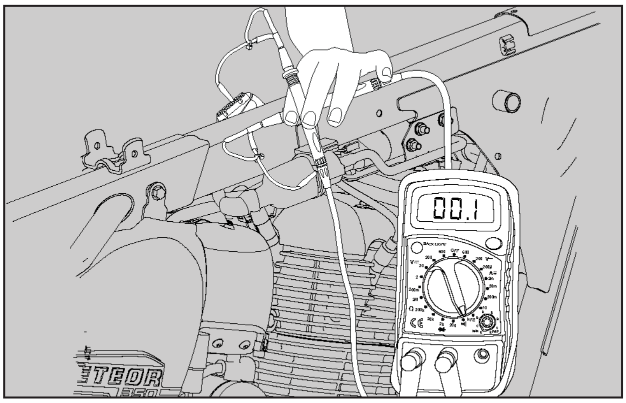
- Keep the multimeter positive probe to Pin 2 (test lead wire with red tag) of the Canister purge solenoid wiring harness coupler .



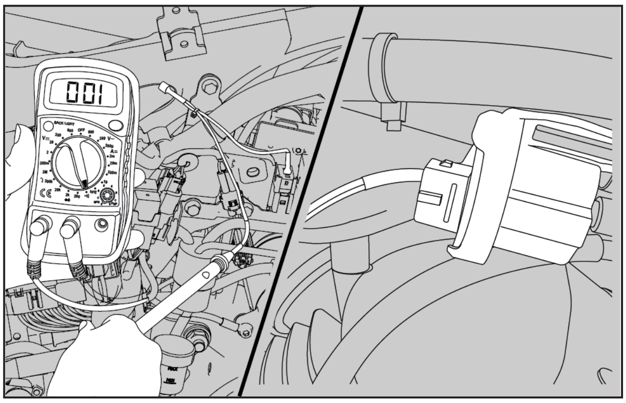
- Connect 40 series (yellow color) test lead wire with black tag to pin 18 of the ECU wiring harness coupler.



- To check continuity, keep the positive probe of the multimeter in pin 2 of the Canister purge valve and negative probe in socket 18 of ECU socket.Check for continuity (Beep sound from multimeter)

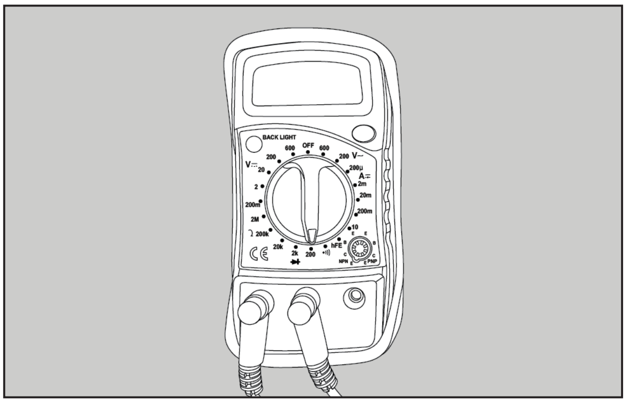


- To check continuity, keep the positive probe of the multimeter in pin 1 of the canister purge solenoid and pin 2 of the Power relay (contact output).Check for continuity (Beep sound from multimeter)



To check the Resistance

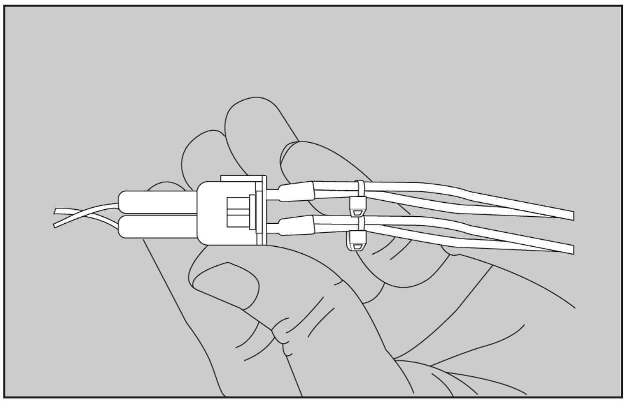
- Keep the multimeter in Resistance mode



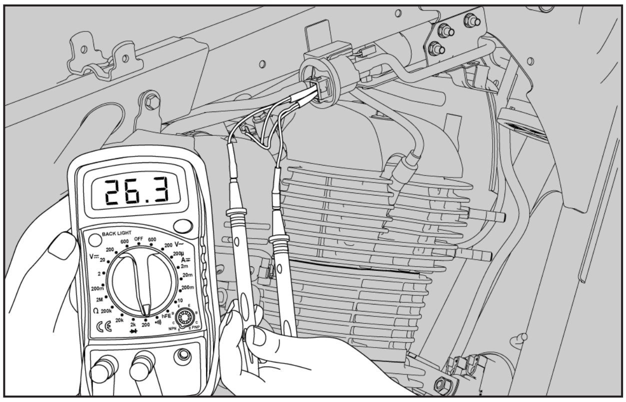
- Connect the Test lead wires 110 series black colour in the canister purge valve coupler.

110 series (black color) Test lead wire with black tag in Pin 1 of Canister purge solenoid coupler

110 series (black color) Test lead wire with red tag in Pin 2 of Canister purge solenoid coupler

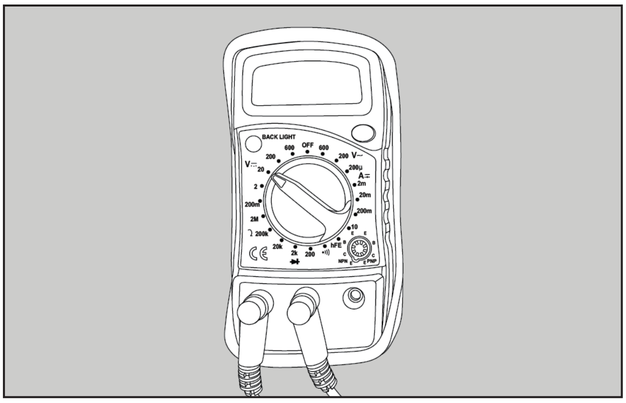


- Keep the multimeter positive probe in Pin 1 (Test lead wire with Black tag) and negative probe in Pin 2 (Test lead wire with red probe). Resistance value to be 24.2 to 27.8 Ohms @ 30 5 °C.

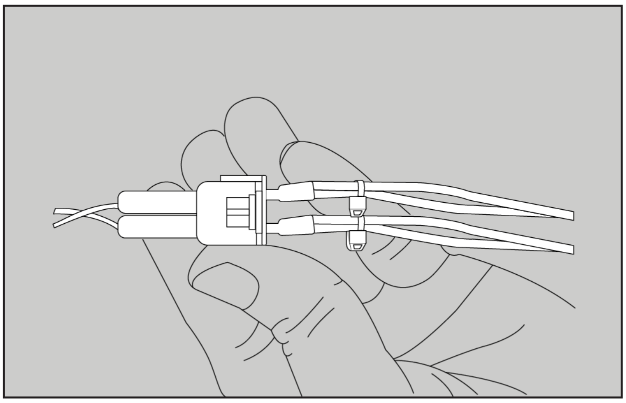


To check the Input voltage

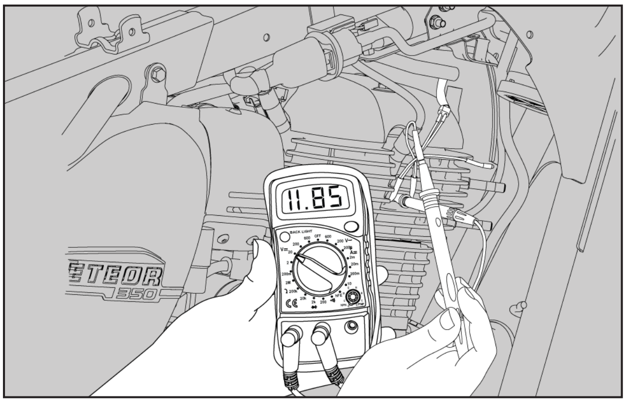
- Keep the multimeter in voltage mode



- Connect the Test lead wires 110 series (black color) in the Secondary air valve wiring harness coupler.
- 110 series (black color) Test lead wire black tag in Pin 1 of secondary air valve wiring harness coupler
- 110 series (black color) test lead wire red tag in Pin 2 of secondary air valve wiring harness coupler



- Connect the multimeter positive probe to pin 1(110 series Test lead wire black colour with Black tag) and negative to body ground in the wiring harness coupler and turn "ON" the ignition and kill switch. The voltage should be equal as the battery voltage (12 V).



d. Decision Point:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (24.2 to 27.8 Ohms @ 30 5 °C), you replace with Secondary air valve
- If the voltage is meeting the specified limit and if continuity is available you have to replace the ECU.

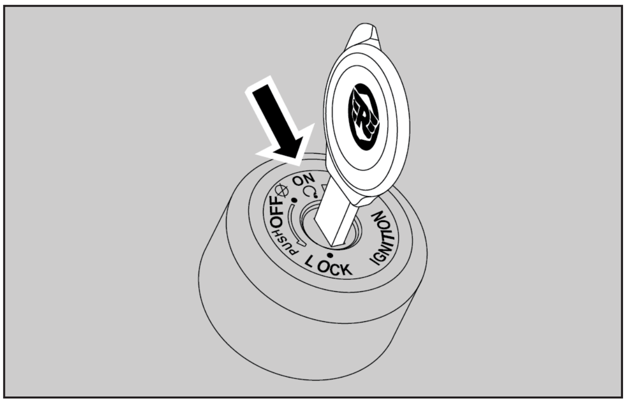
It is recommended to replace the secondary Air Valve /ECU / Wiring Harness as per the advice from Royal Enfield only

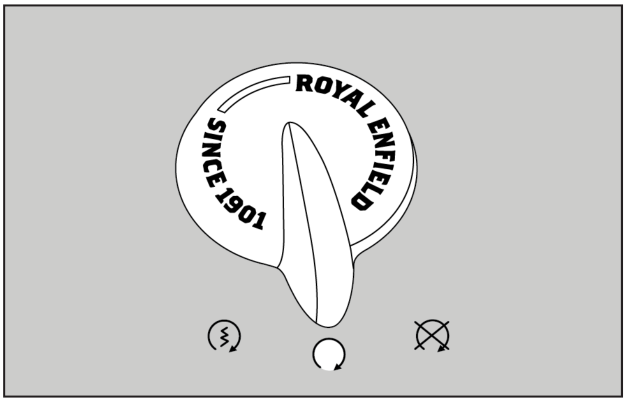
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

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P 0198 - ENGINE OIL TEMPERATURE DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Code
1	P0198	Engine oil temperature sensor	Engine oil temperature sensor Circuit High / Open

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, By clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Engine oil temperature sensor (Engine oil temperature) is also called as coolant temperature sensor
TROUBLE CODE: DTC CODE: P0198

Type of error : Engine oil temperature sensor circuit High / Open

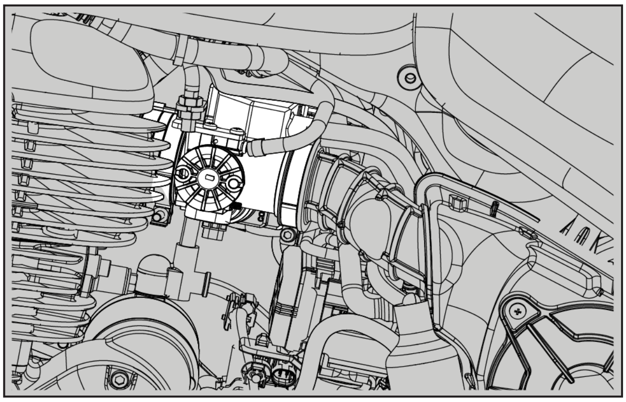
(i) Information : Engine oil temperature sensor circuit fault / Engine oil temperature sensor internal fault

b.Preliminary Checks (Basic Check Points):

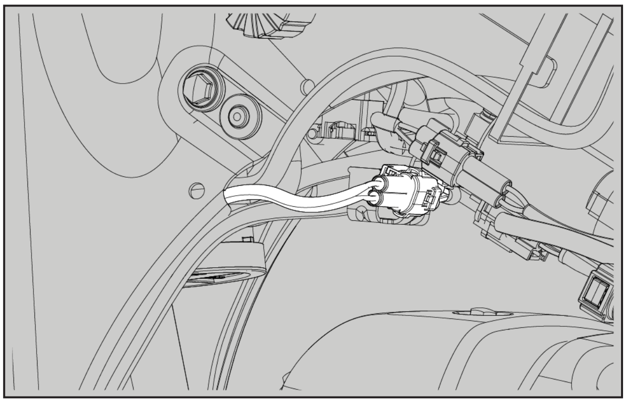
⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

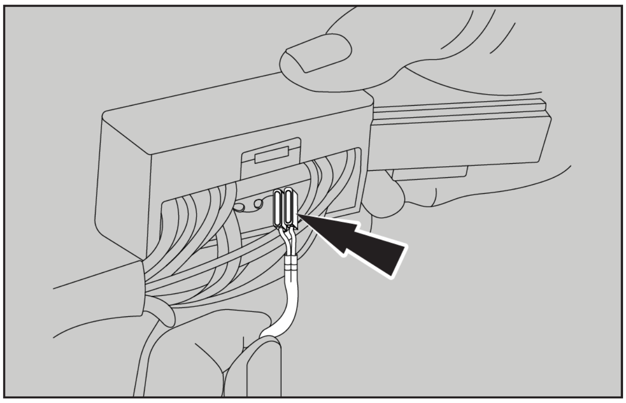
- ECU coupler is located in the Throttle body Assembly



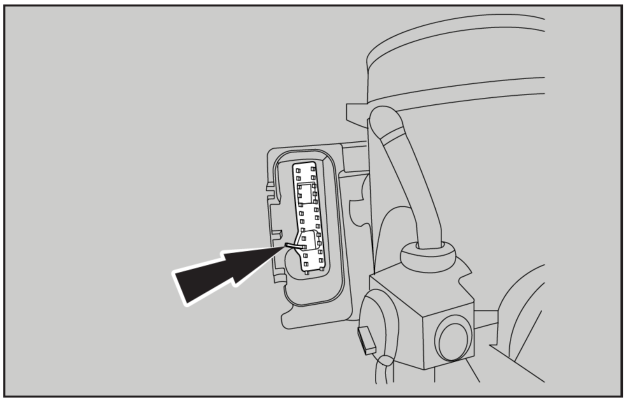
- Engine oil temperature sensor coupler is located near Cylinder head



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

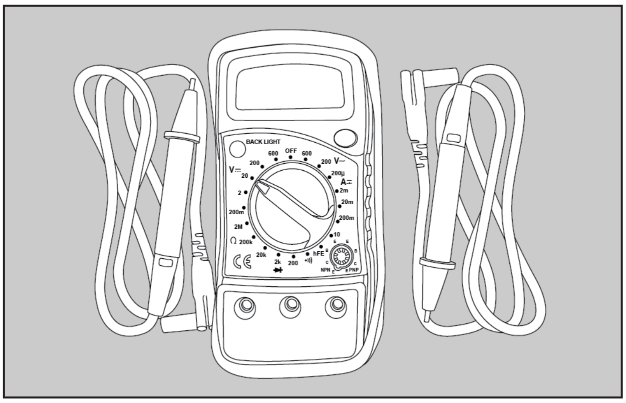
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

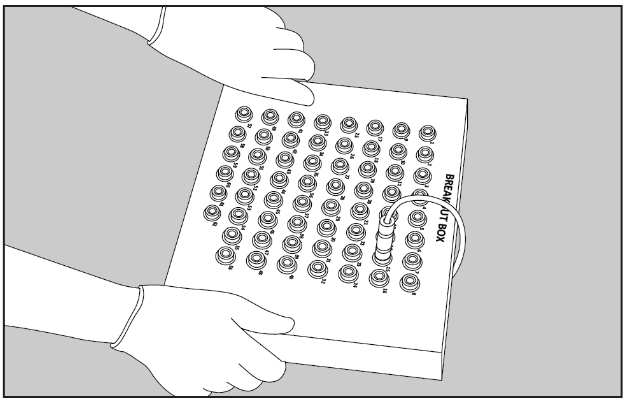
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

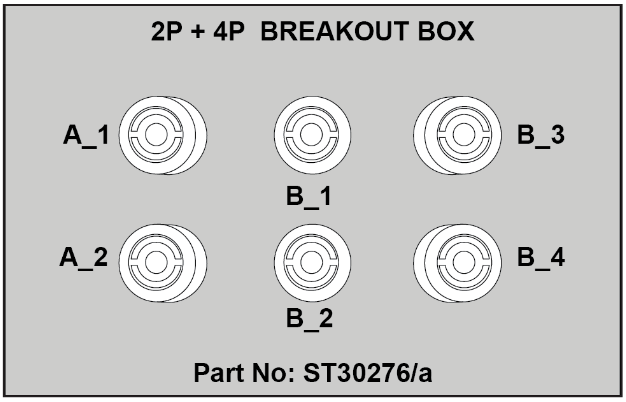
- **Tools Required**
- Multimeter (Universal)



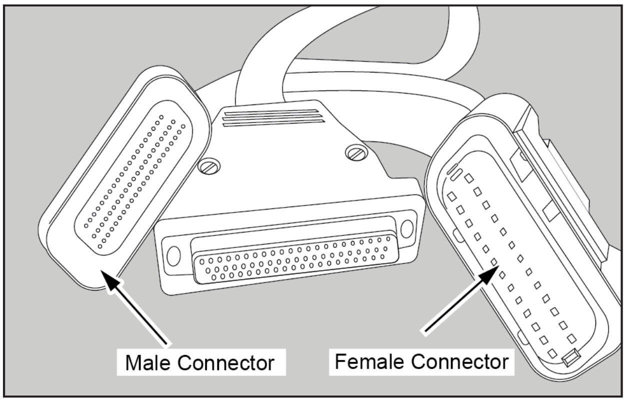
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit

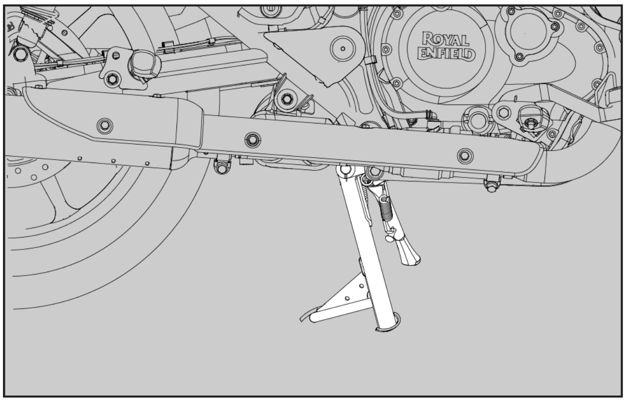

2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

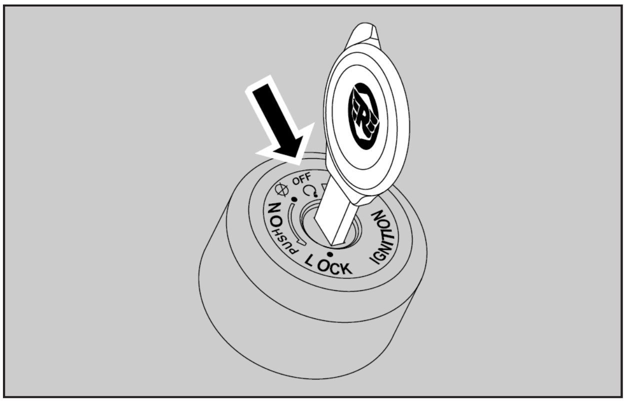

Male Connector
Female Connector

b. Pre-Checks:

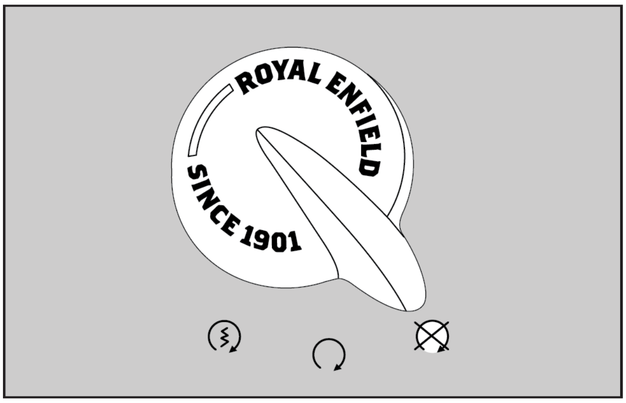
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

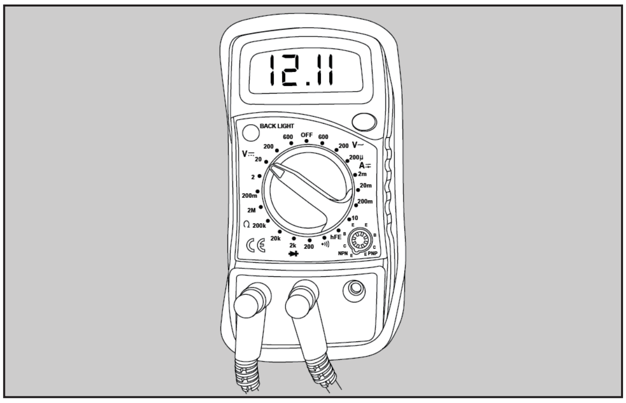

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

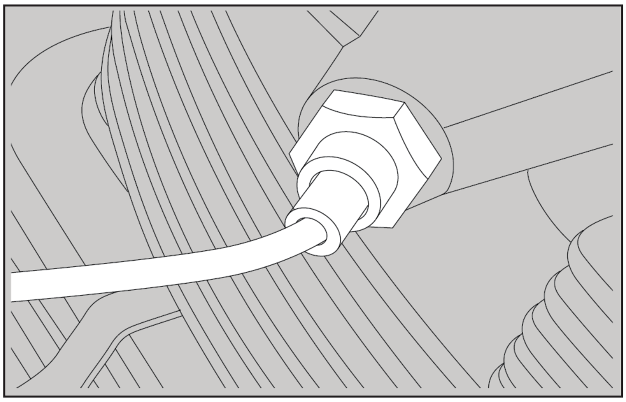
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Engine oil temperature sensor*

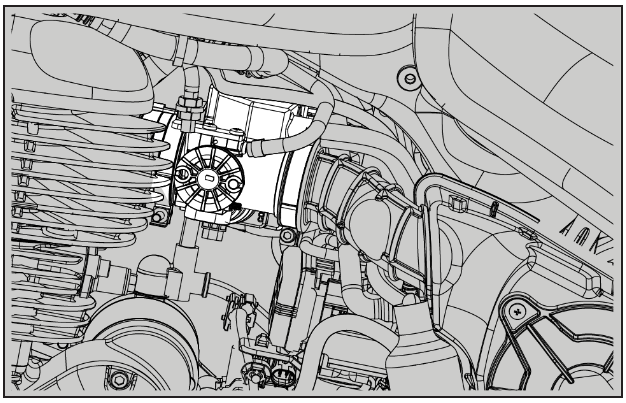
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

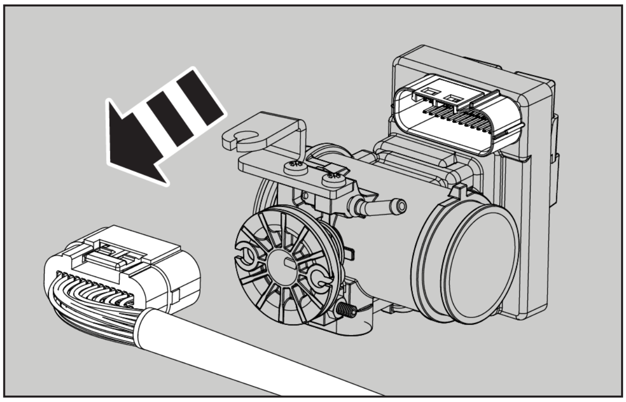
- Engine oil temperature sensor is located in the cylinder head



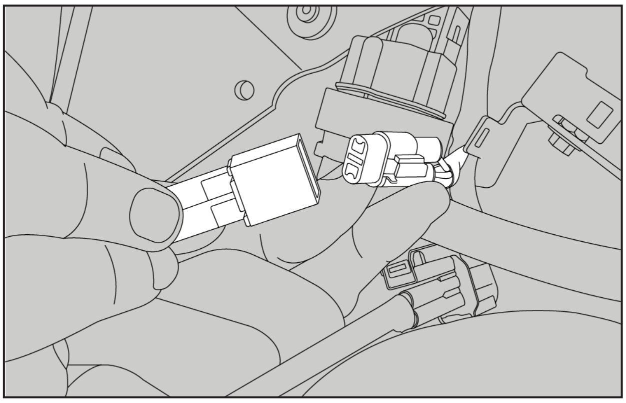
- ECU is located in the throttle body assembly



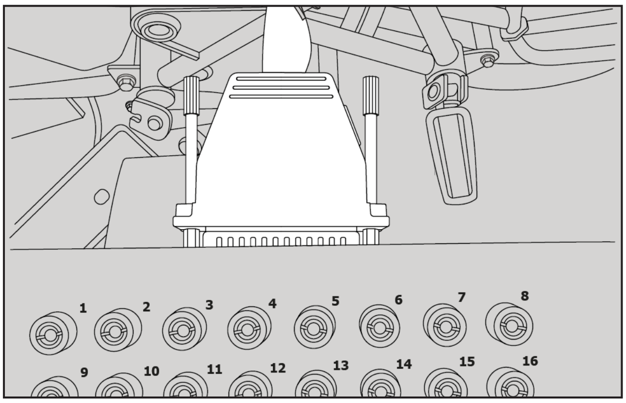
- Disconnect ECU coupler.



- Disconnect Engine oil temperature sensor coupler.



- Connect ECU breakout box harness coupler to Breakout box harness (62 Pin Kit)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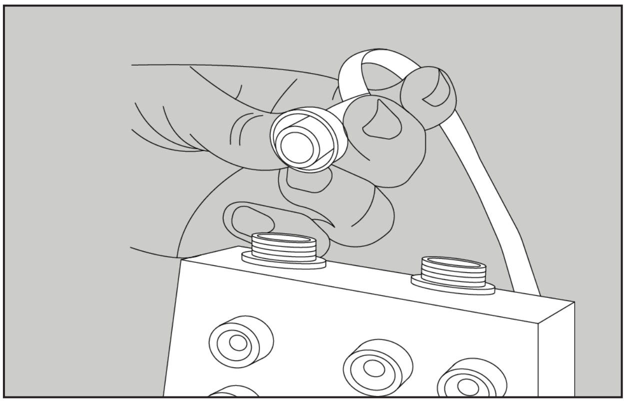
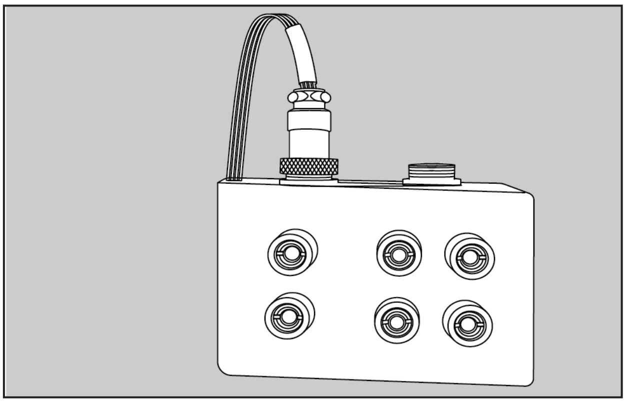
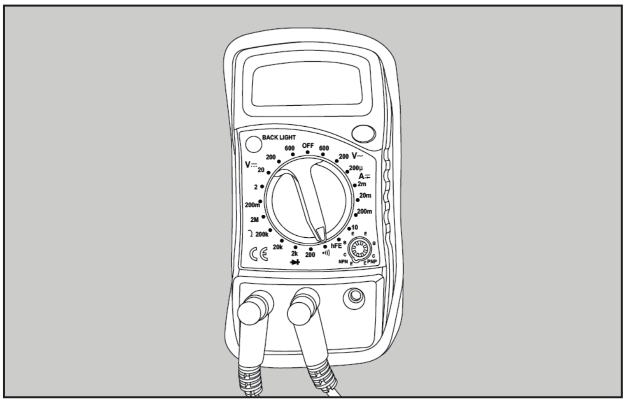
- Connect Engine oil temperature sensor breakout box harness to Sensor break out box.



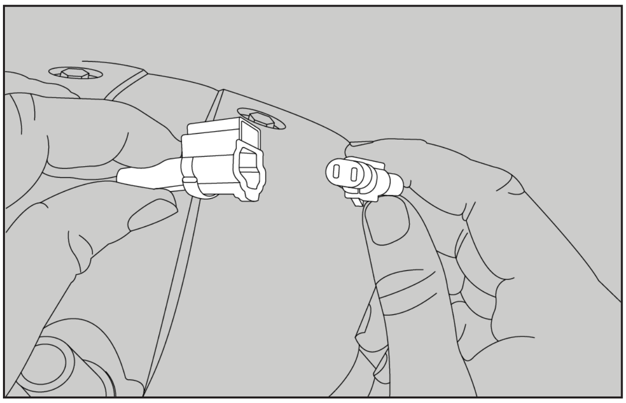


a. To check Continuity of Wiring harness

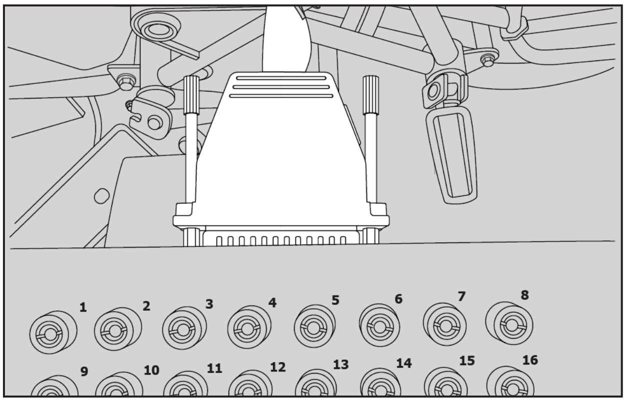
- Keep the multimeter in continuity mode


BACK LIGHT
OFF
600
200
V
A
200m
20k
200k
2M
hFE

- Connect the Engine oil temperature sensor breakout wiring harness to sensor wiring harness coupler



- connect the ECU breakout box harness to ECU wiring harness coupler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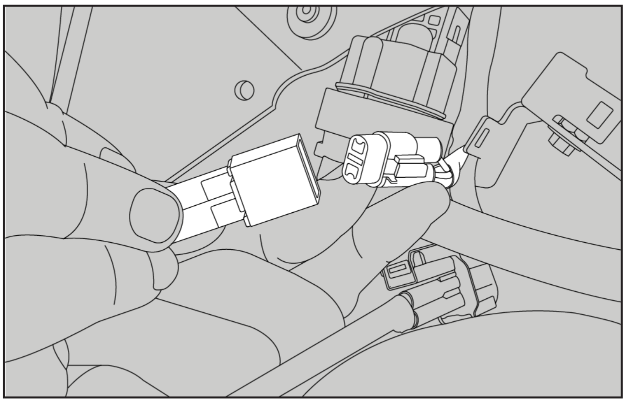
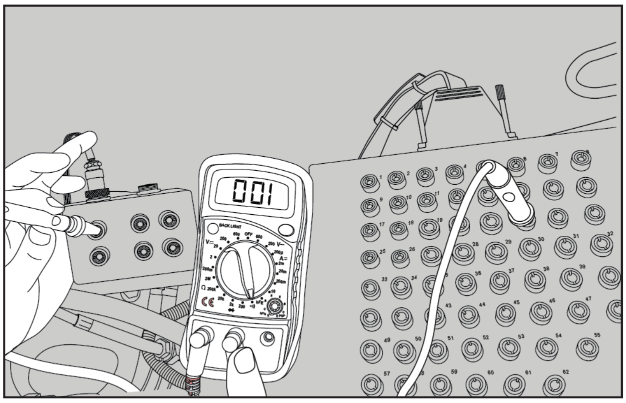
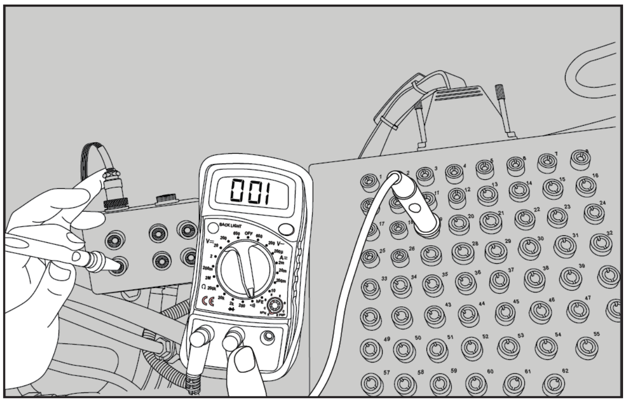


- Keep the multimeter positive probe in socket 1 of the sensor break outbox and negative probe in socket 22 of the ECU breakout box. Check for continuity (Beep Sound from the multimeter)

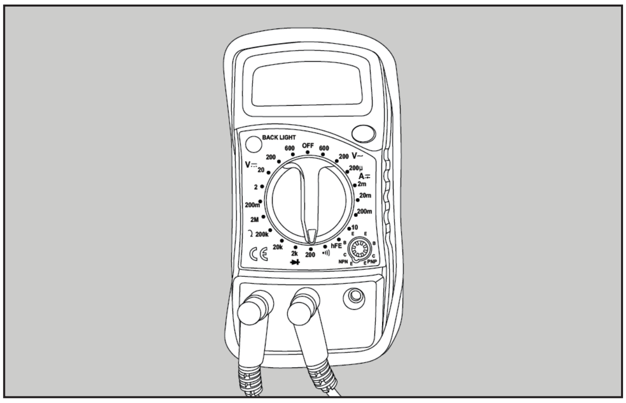


- Keep the multimeter positive probe on socket 2 of the sensor break outbox and negative probe on socket 19 of the ECU breakout box. Check for continuity (Beep Sound from the multimeter)

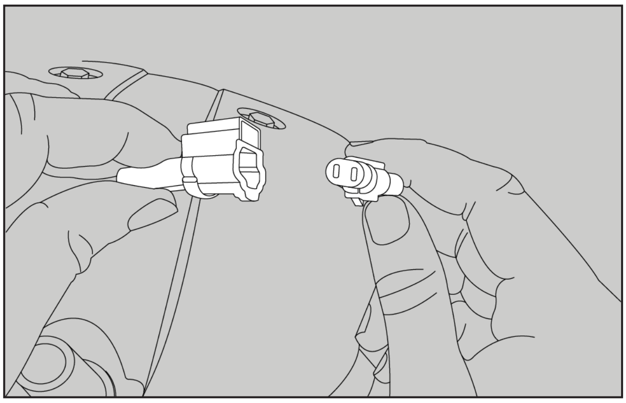


b. To check the resistance of Sensor

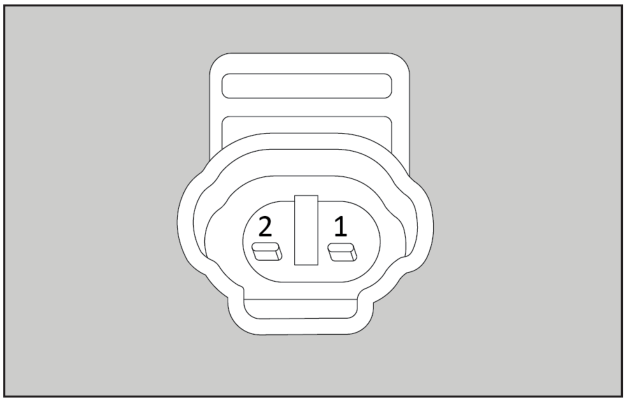
- keep the multimeter in Resistance mode (200 Ohms)

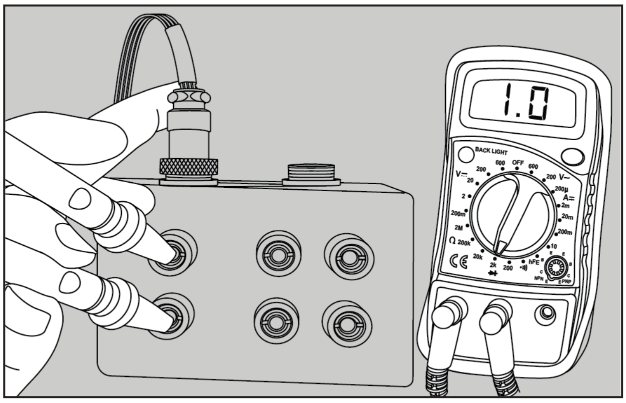


- Connect the Engine oil temperature Sensor break out box harness to Engine oil temperature sensor coupler



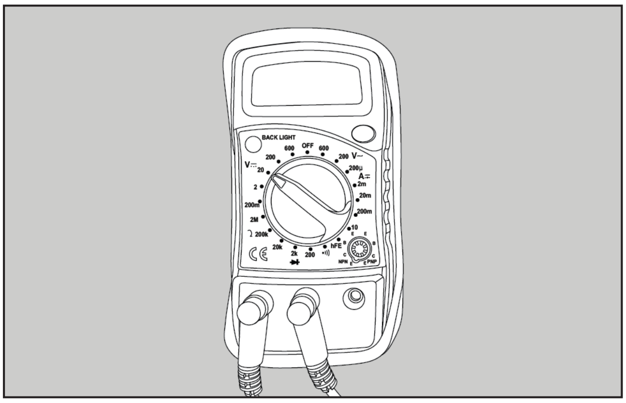
- To check the Resistance value of the engine oil temperature sensor, connect the multimeter in Socket 1 and Socket 2 of the breakout box - 2P +4P Pin kit. The resistance value is to be between 3.09kΩ to 75.88kΩ considering a range of - 20 Deg C to + 60 Deg C without warm-up condition.
- After Engine warm-up for 3 minutes and then check the resistance between Socket 1 and Socket 2 the resistance value is to be less than 1.5 KΩ.



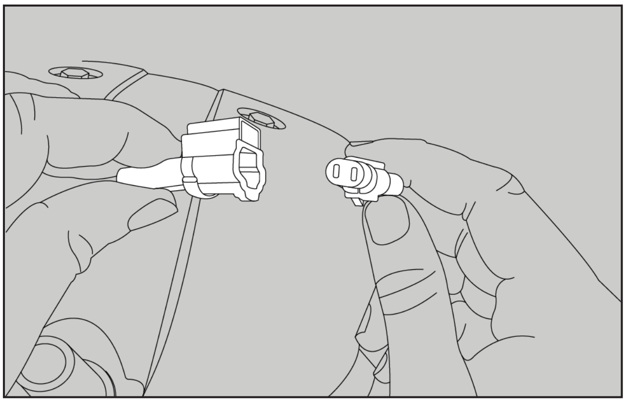


C. To check output voltage

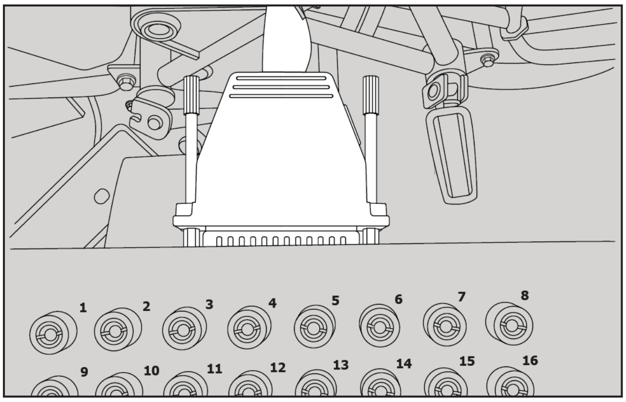
- Keep the multimeter in voltage mode (20V)


BACK LIGHT
OFF
200
600
20
2
200m
2M
200k
20k
2k
200
hFE
10
200m
20m
2m
200µ

- Connect the Engine oil temperature sensor breakout wiring harness to Engine oil temperature sensor wiring harness coupler.



- Ensure the ECU break out box harness is connected to ECU coupler and ECU wiring harness coupler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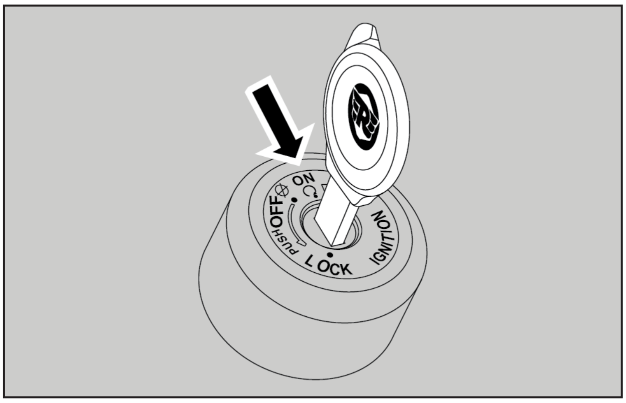
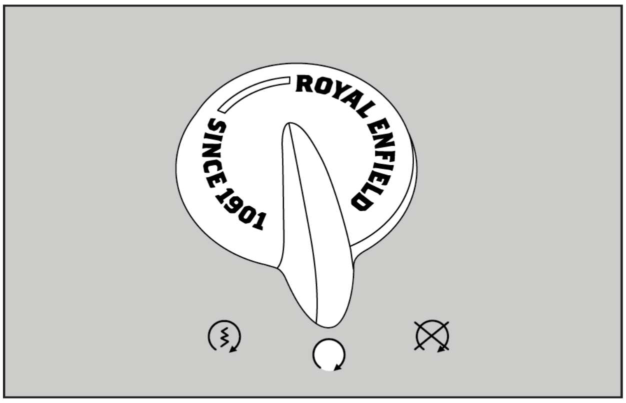
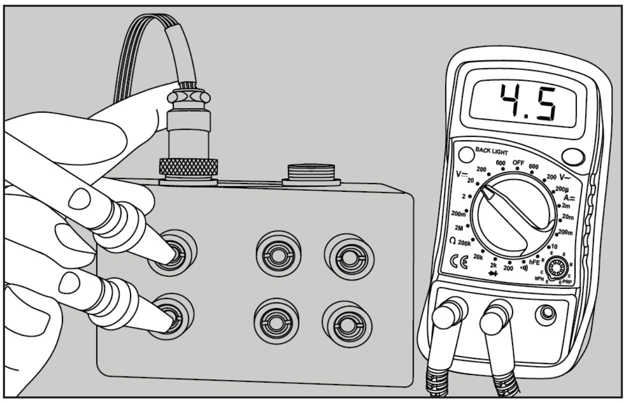
- Turn the Ignition and kill switch "ON"

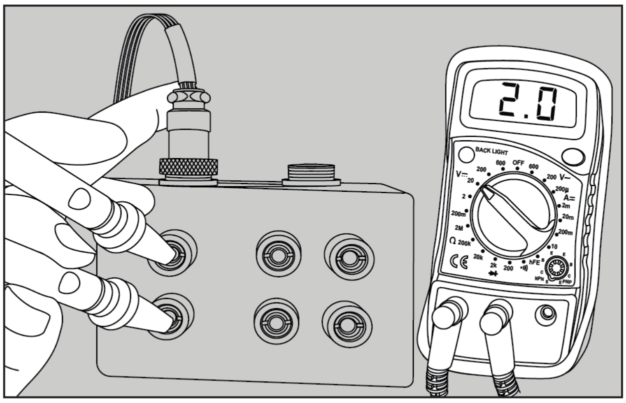

ON
PUSH OFF
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the engine and keep it in idle RPM
- Place the multimeter positive probe in Socket 2 of sensor break out box (2P+4P) and negative probe in socket 1 of sensor break outbox
- Check the voltage when the engine temperature is equal to ambient temperature (without engine warm-up). Voltage should be 3.1V to 4.87 V (- 20 Deg C to 60 Deg C)


4.5
BACK LIGHT

- Check the voltage when the engine is warmed up for 3 minutes with half throttle Voltage should be less than 2.25 V



d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (3.09kΩ to 75.88kΩ) and without engine warm-up (less than 1.5 K Ohms), you replace with Engine oil temperature Sensor
- If the voltage is not meeting the specified limit (between 3.1V to 4.87 V (- 20 Deg C to 60 Deg C) or if 5 V is observed and if continuity is available you have to replace the ECU.
- If the voltage is not meeting the specified limit (less than 2.25V at engine warm-up) or if 5V is observed and if continuity is available you have to replace the ECU.

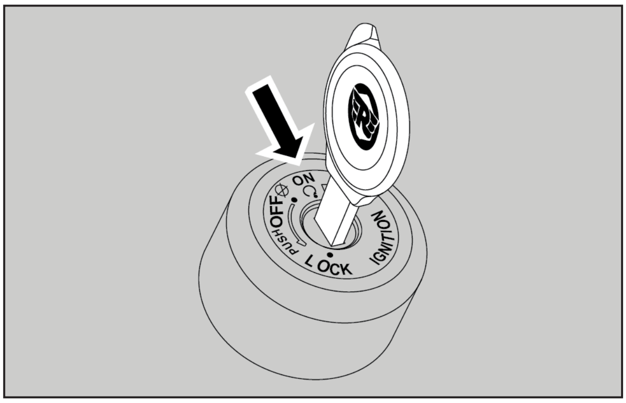
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

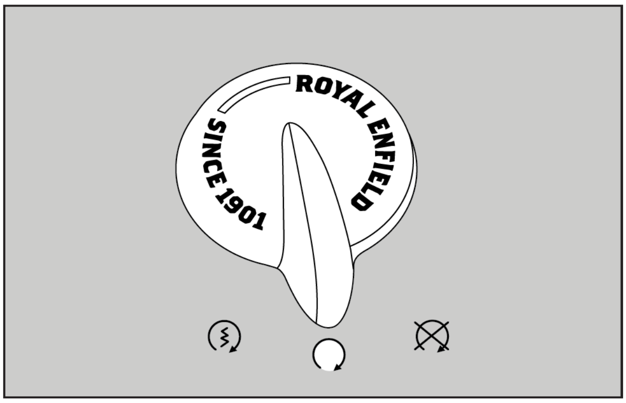
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





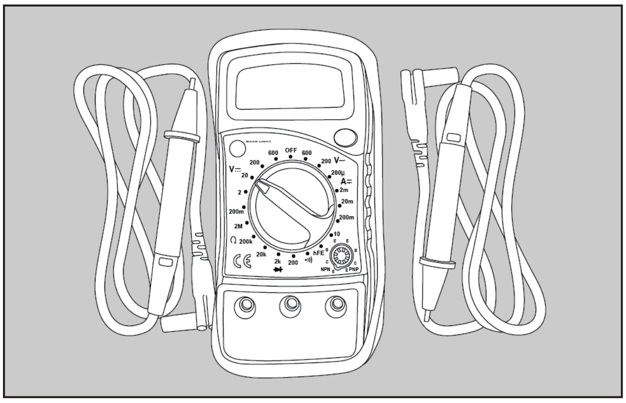
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and need to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

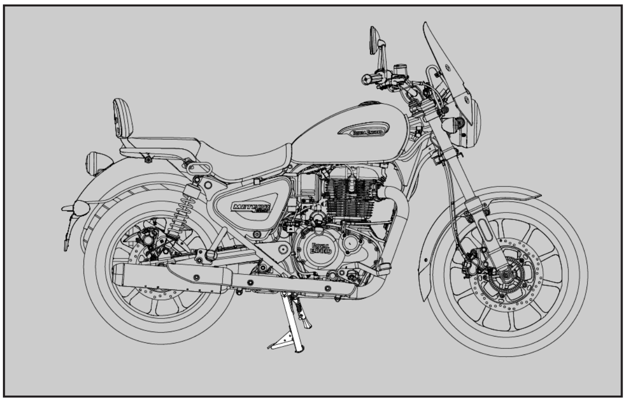


- Test lead wire (90 SERIES - ORANGE Color Wire) for Sensor
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (It will be given as hyperlink)

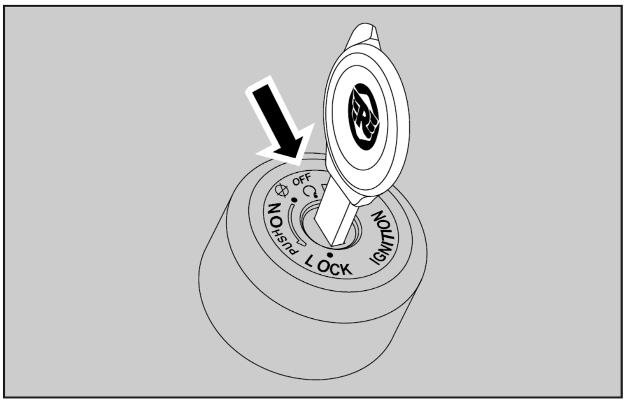
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

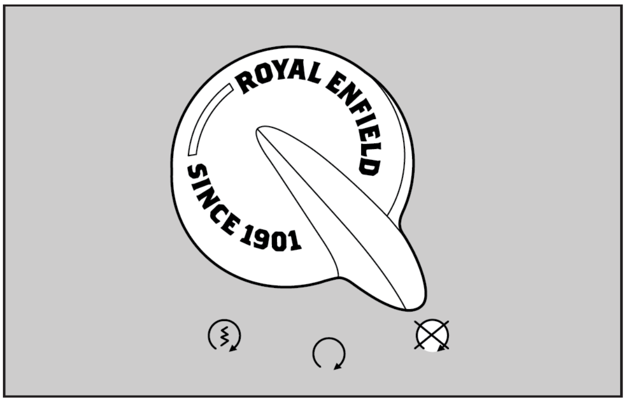
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

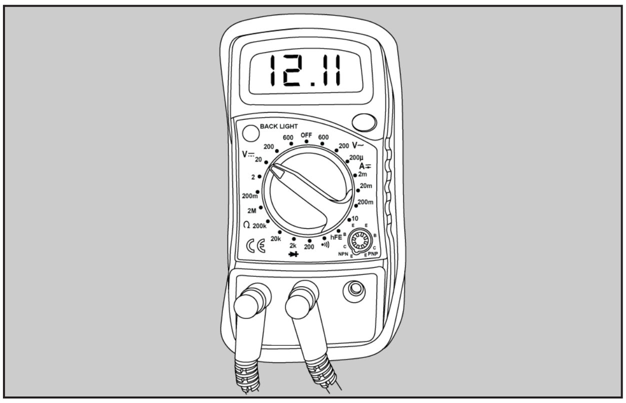


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring the above precondition only you are advised to proceed for the diagnosis steps.

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers

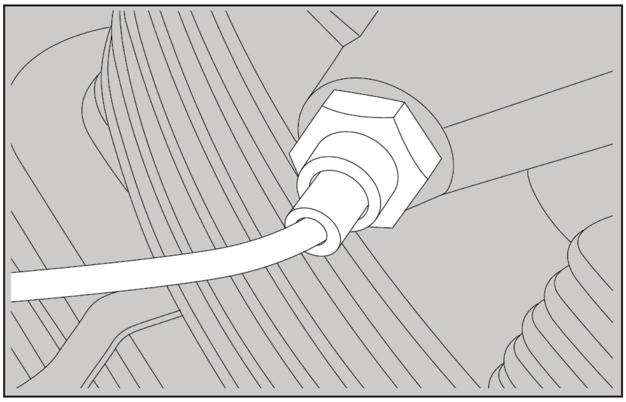
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Engine oil temperature Sensor*

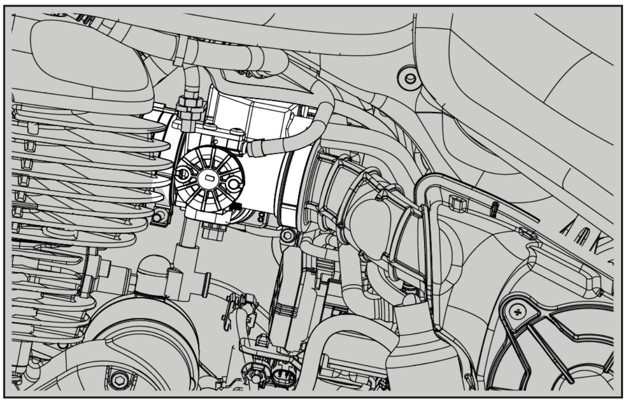
NOTE

- *Removal & refitment of Seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

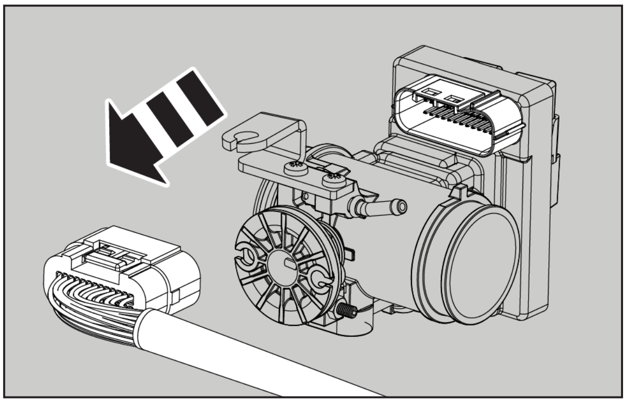
- Engine oil temperature sensor is located in the cylinder head



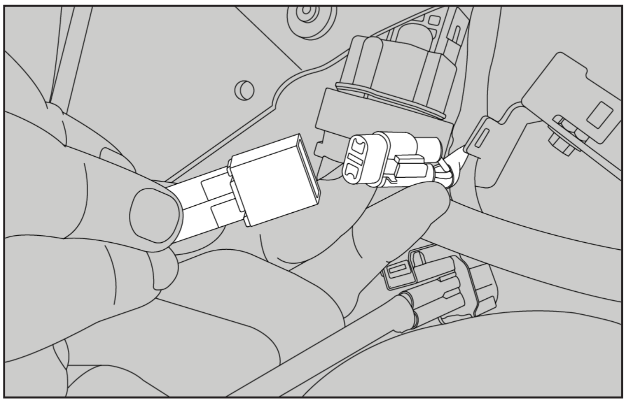
- ECU is located on the throttle body

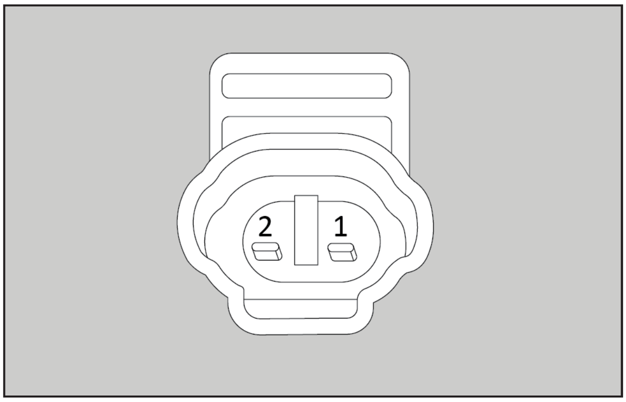


- Disconnect the ECU wiring harness coupler from ECU



- Disconnect the Engine oil temperature sensor Coupler

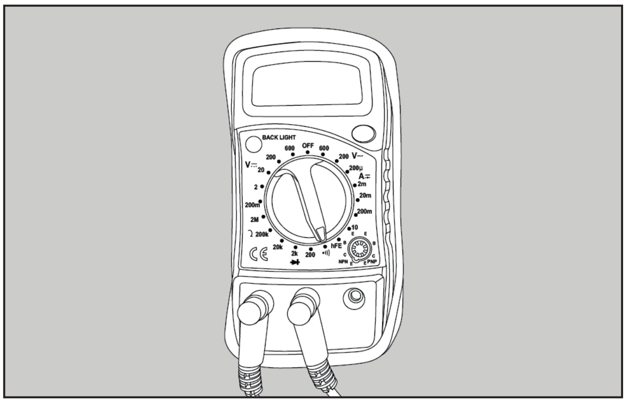




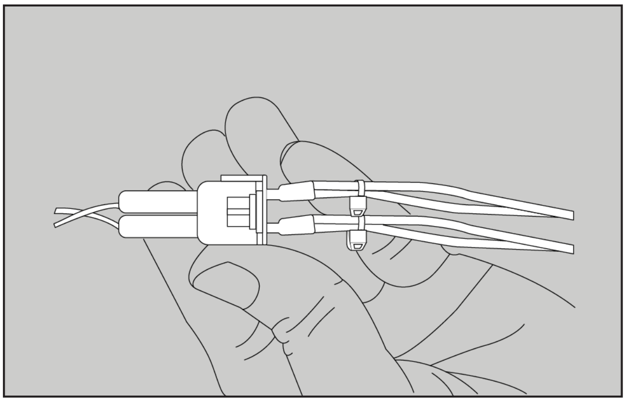
To check Continuity of the Wiring Harness

STEP 1:

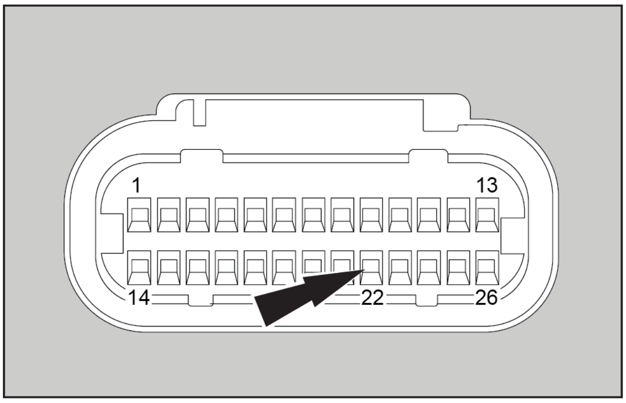
- Keep the multimeter in continuity mode



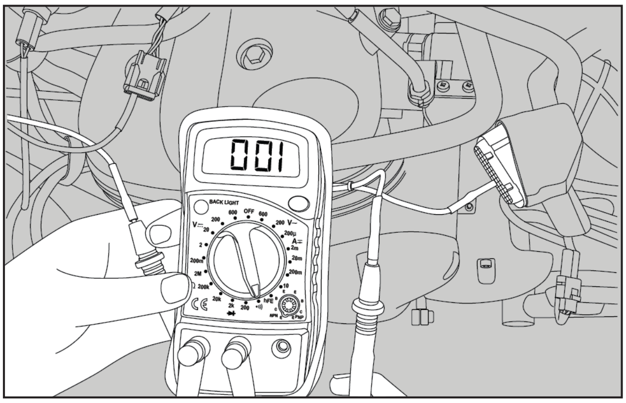
- Connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor wiring harness socket.



- Connect test lead wire 40 series (yellow color) with the black tag to Pin 22 of the ECU harness socket.

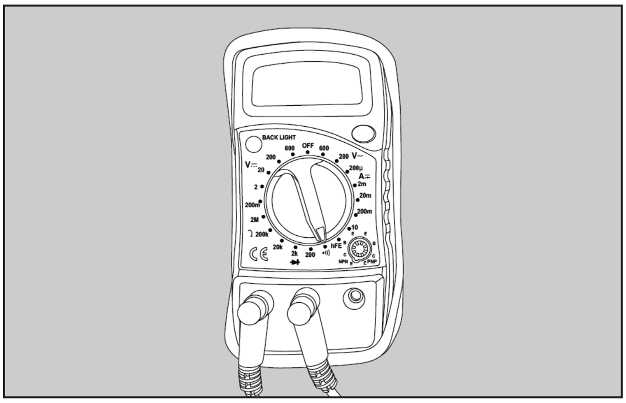


- Check for continuity (Beep Sound from the multimeter)

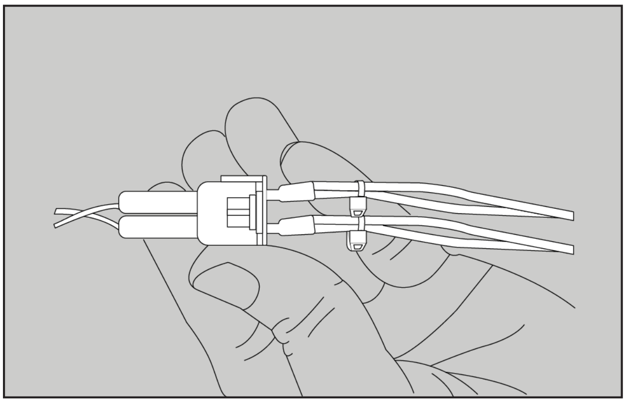


STEP2:

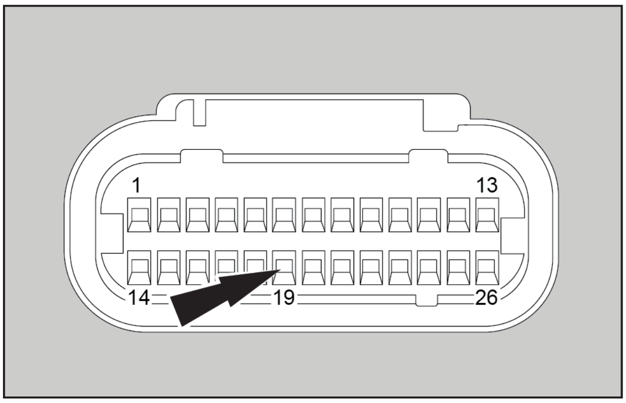
- Keep the multimeter in continuity mode



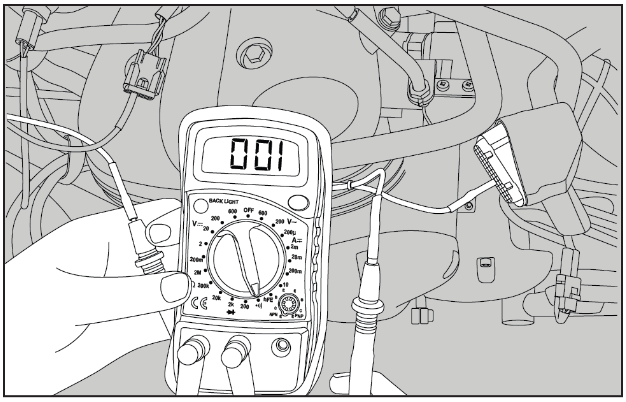
- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the sensor wiring harness socket



- Connect test lead wire 40 series (yellow color) with the red tag to Pin 19 of the ECU harness socket.



- Check for continuity (Beep Sound from the multimeter)

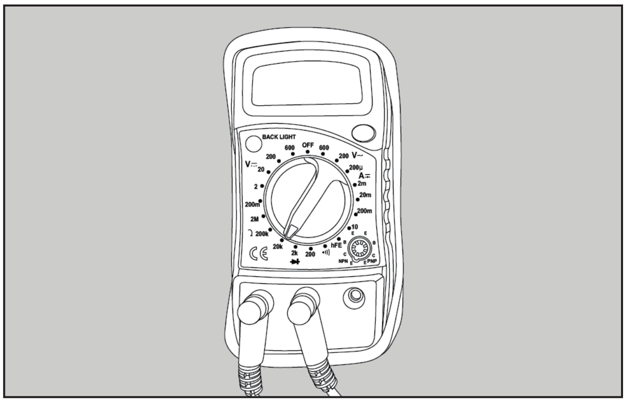


⚠ CAUTION

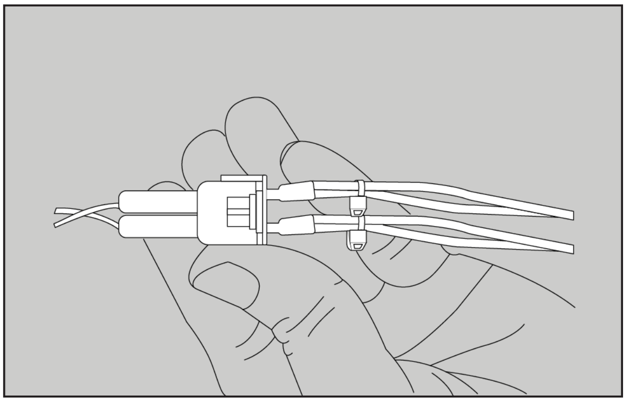
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

b. To check Resistance of the Sensor

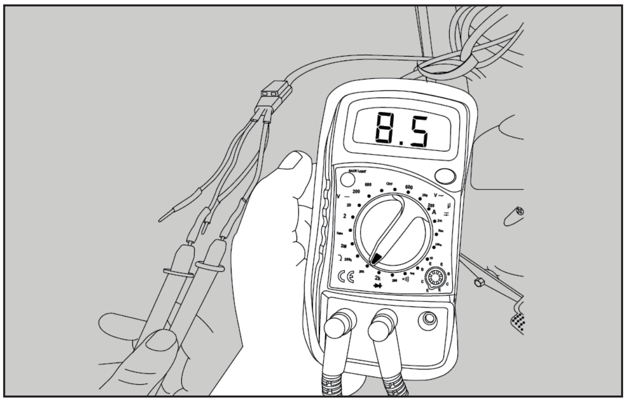
- Keep the multimeter in resistance mode (20K ohm)



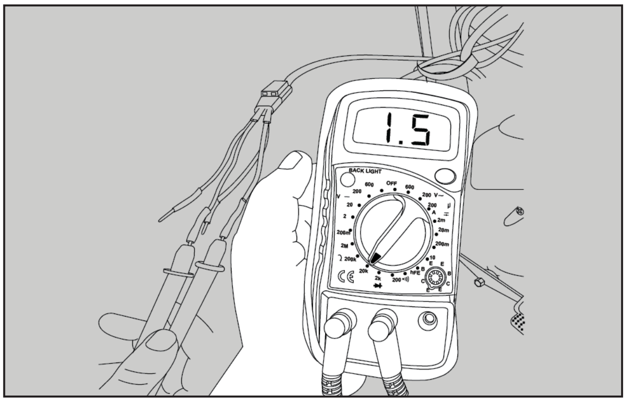
- Connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor socket and connect test lead wire 90 series (orange color) with the red tag to pin 2 of the sensor socket



- Check the Resistance between Pin1 and Pin 2. Resistance value to be between 3.09kΩ to 75.88kΩ considering a range of - 20 Deg C to + 60 Deg C (Condition: without engine warm-up condition)



- Check the Resistance between Pin1 and Pin 2. Resistance value to be less 1.5 K ohm at Engine warm-up condition (Condition: 3-minute warmup with half throttle)

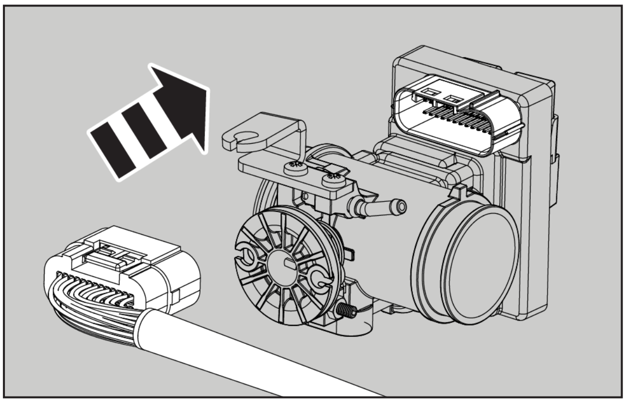


⚠ CAUTION

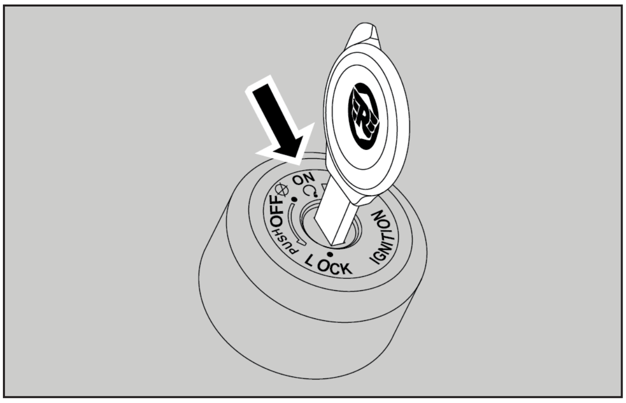
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

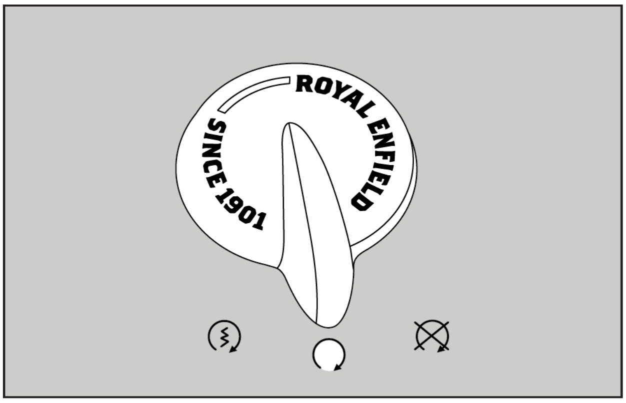
c. To check the Output voltage

- Connect the ECU coupler to ECU

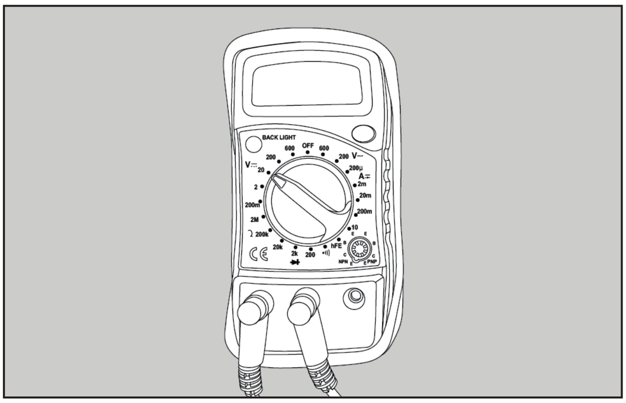


- Turn "ON" the Ignition and kill switch

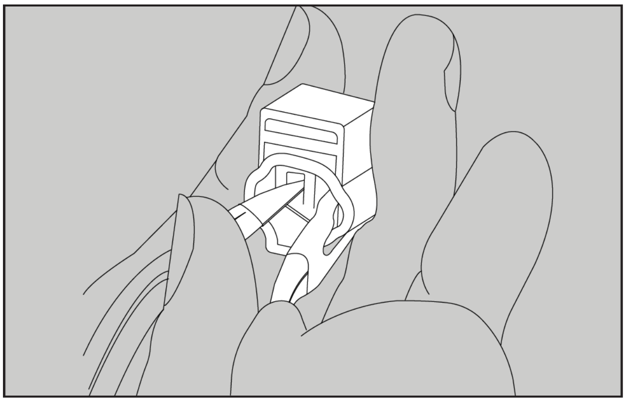


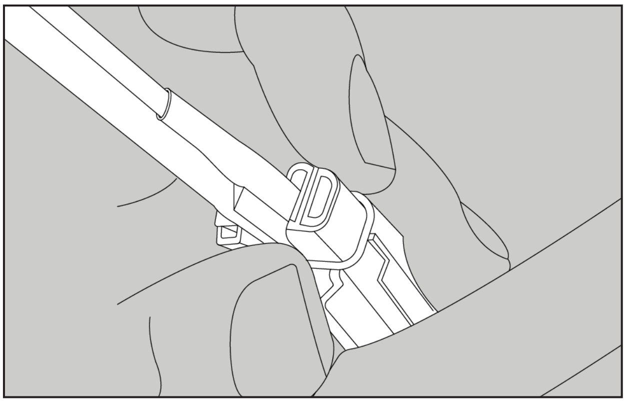


- Keep the multimeter in Voltage mode (20 V)

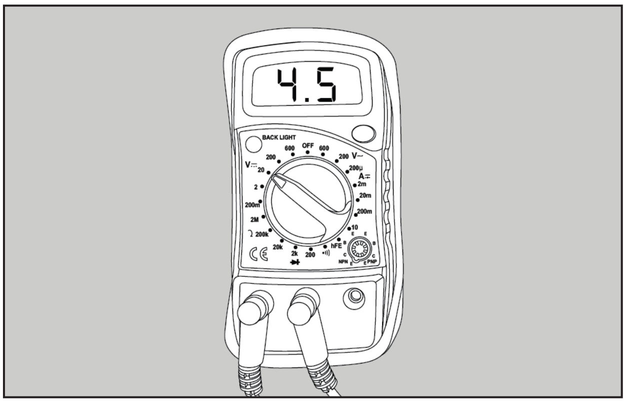


- Connect the test lead wire 90 series (orange color) with the black tag in the sensor socket Pin 1 and other test lead wire 90 series (Orange Color) with the red tag in the sensor socket pin2, then connect the other end of the test lead wire in the sensor wiring harness

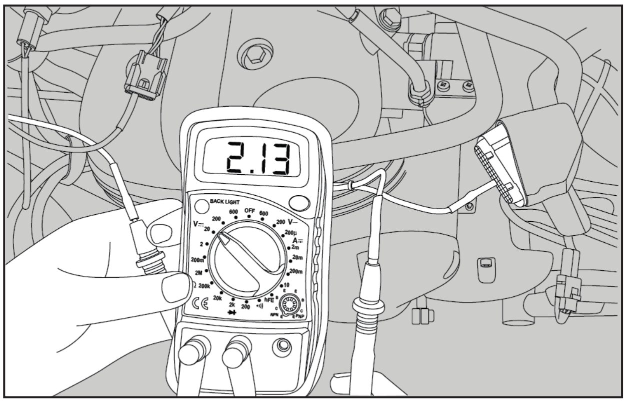




- Place the multimeter positive probe in pin 2 (red tag test lead wire) and negative probe in Pin 1 (black tag test lead wire). Start the engine and keep it in idle RPM
- Voltage should be between 3.1V to 4.87 V (-20 Deg C to 60 Deg C) (Condition: ambient temperature without engine warm-up)



- Place the multimeter positive probe in pin 2 (red tag test lead wire) and negative probe in Pin 1 (black tag test lead wire). Voltage should be less than 2.25 V. (Condition: Engine warm-up for 3 mins at half throttle



⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (3.09kΩ to 75.88kΩ) and without engine warm-up (less than 1.5 K Ohms), you replace with Engine oil temperature Sensor
- If the voltage is not meeting the specified limit (between 3.1V to 4.87 V (- 20 Deg C to 60 Deg C) or if 5 V is observed and if continuity is available you have to replace the ECU.
- If the voltage is not meeting the specified limit (less than 2.25V at engine warm-up) or if 5V is observed and if continuity is available you have to replace the ECU.

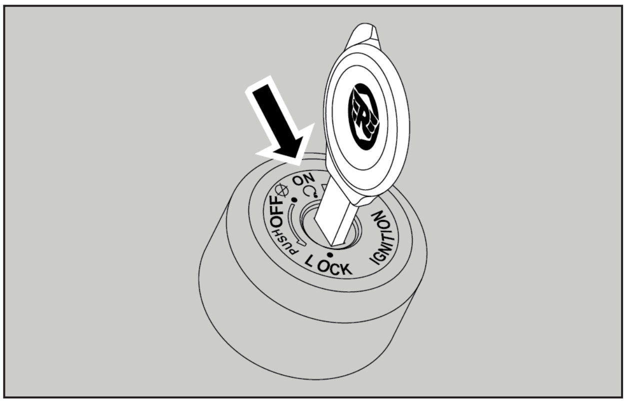
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

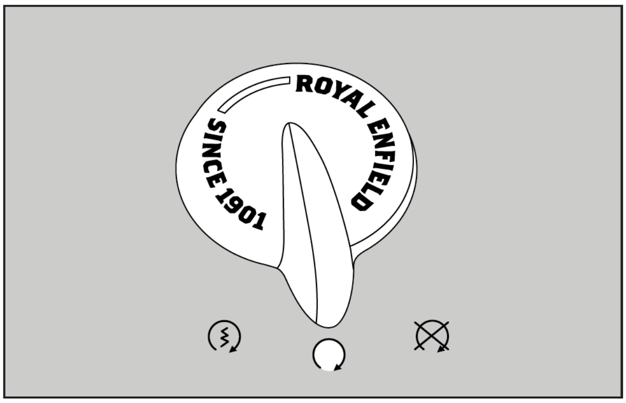
1.3.1. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0298 - ENGINE OIL TEMPERATURE DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Code
1	P0298	Engine oil temperature sensor	Engine oil temperature sensor over temperature

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC, By clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Engine oil temperature sensor (Engine oil temperature) is also called as coolant temperature sensor
TROUBLE CODE: DTC CODE: P0298

Type of error : Engine oil temperature sensor over temperature

(i) Information : Engine oil temperature sensor circuit fault / Engine oil temperature sensor internal fault

b.Preliminary Checks (Basic Check Points):

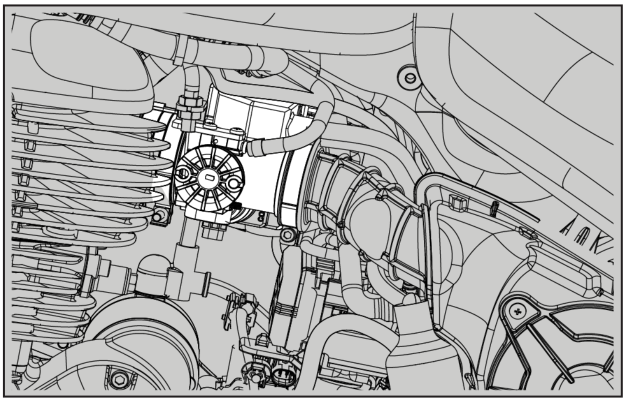
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

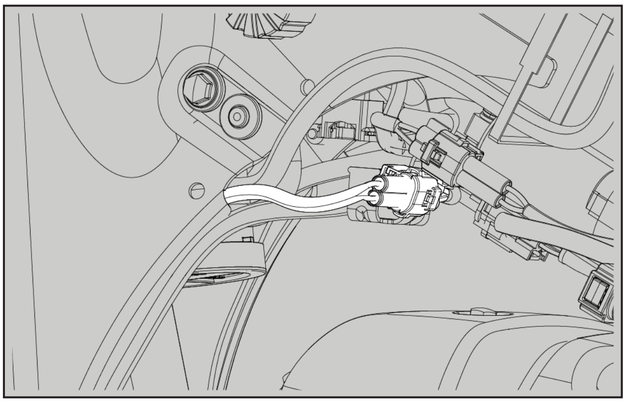
⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

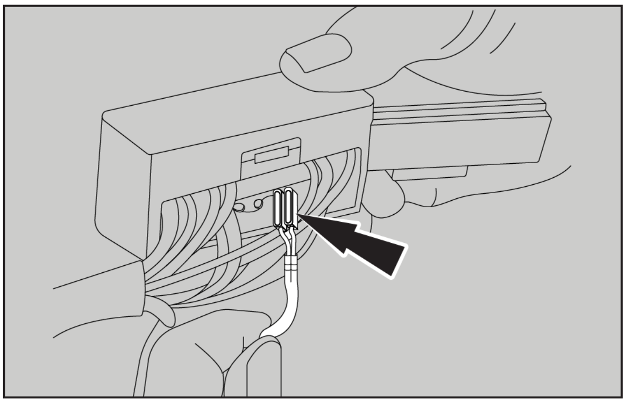
- ECU coupler is located in the Throttle body Assembly



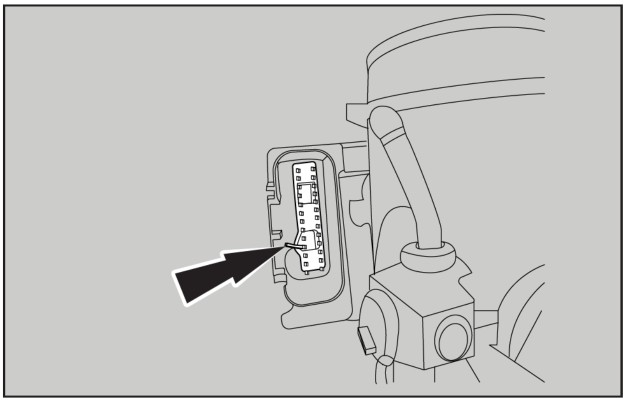
- Engine oil temperature sensor coupler is located near Cylinder head



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

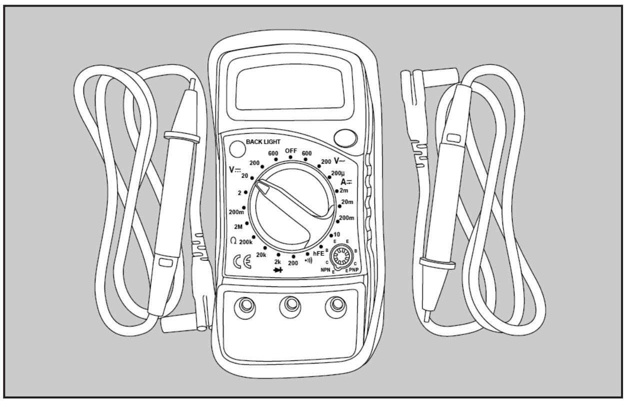
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

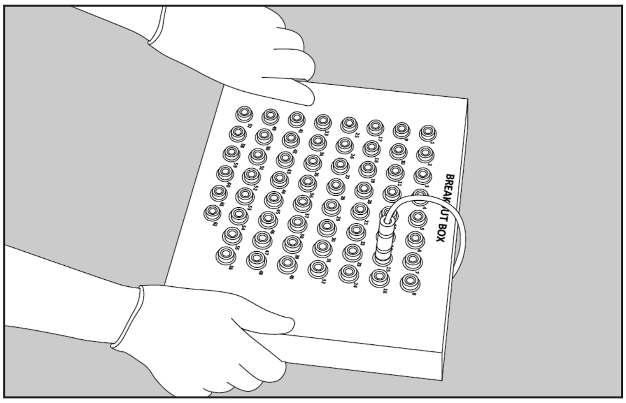
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

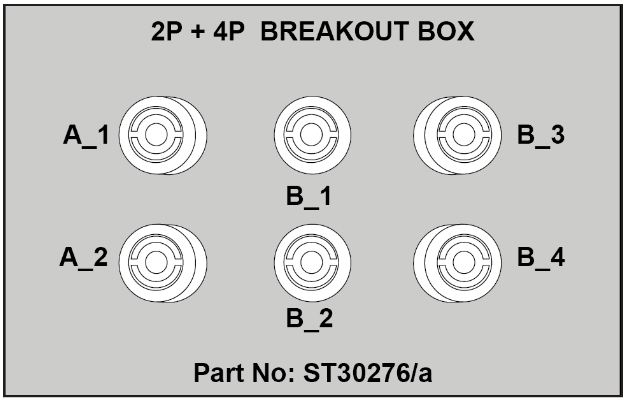
- ***Tools Required***
- Multimeter (Universal)


BACK LIGHT
OFF

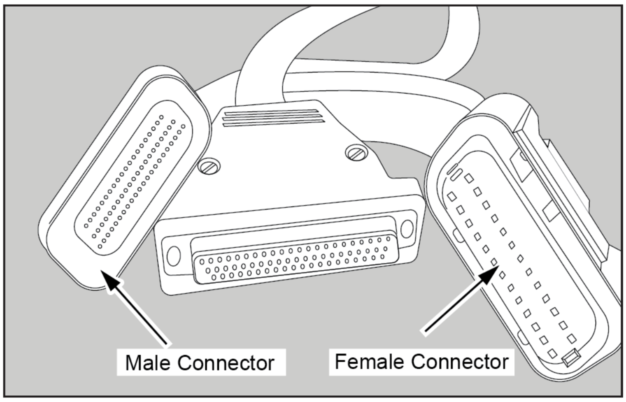
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit

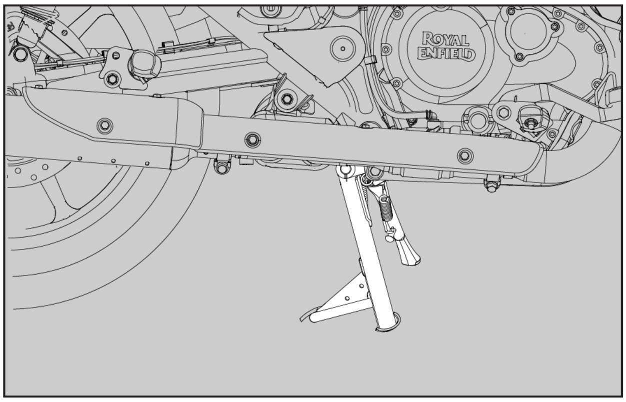

2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

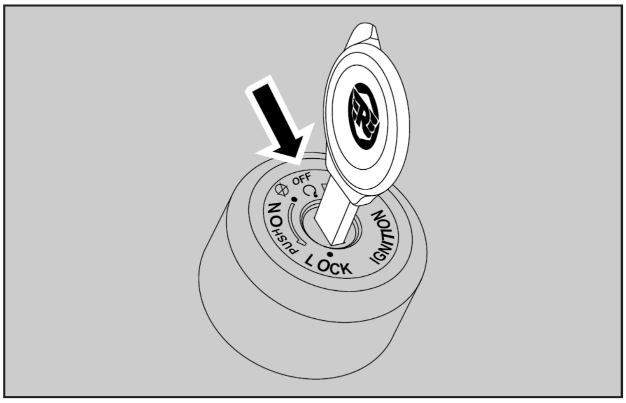

Male Connector
Female Connector

b. Pre-Checks:

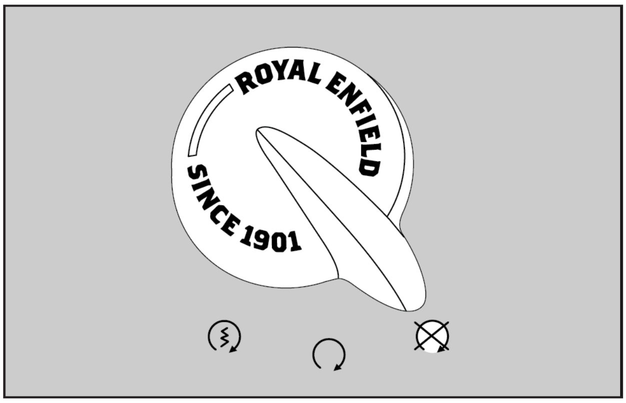
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition

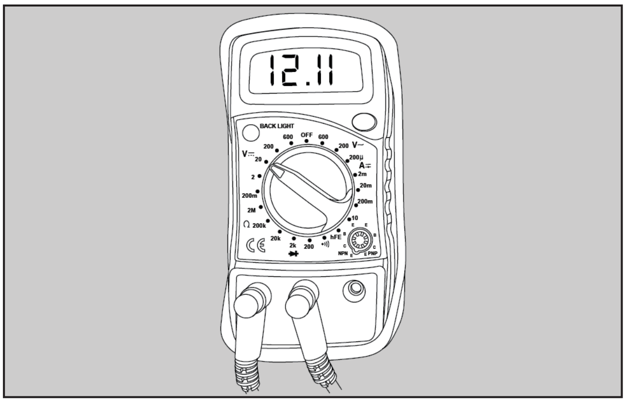

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

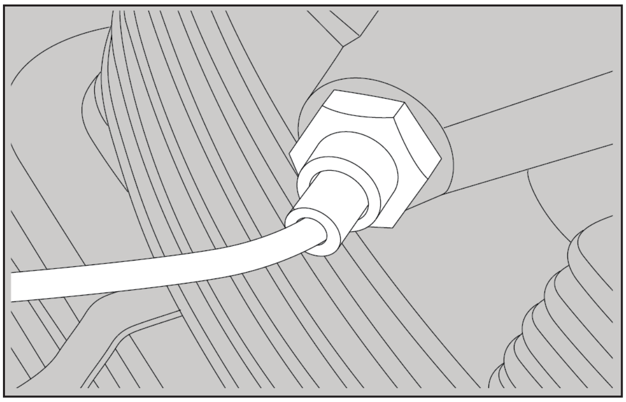
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Engine oil temperature sensor*

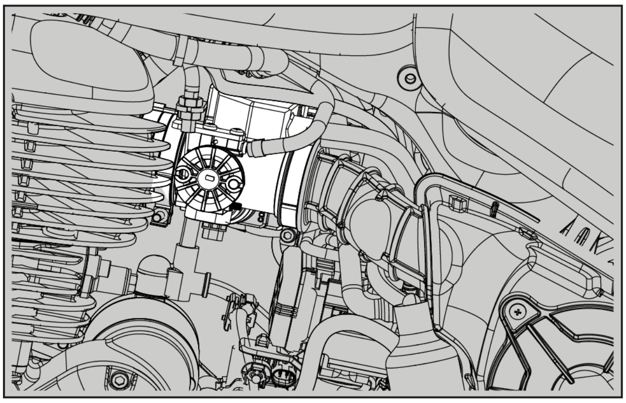
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

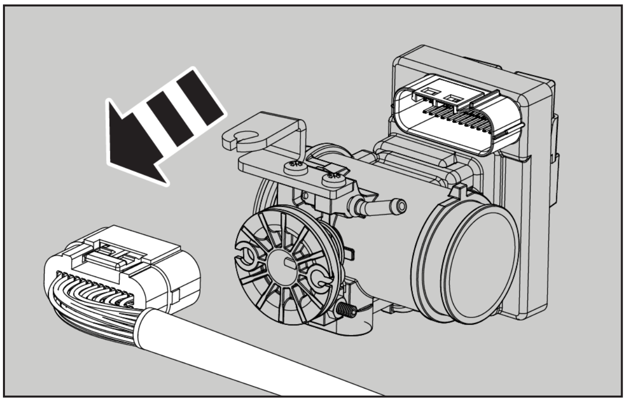
- Engine oil temperature sensor is located in the cylinder head



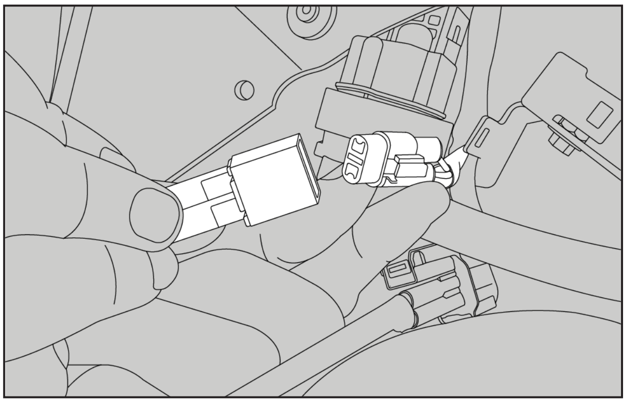
- ECU is located in the throttle body assembly



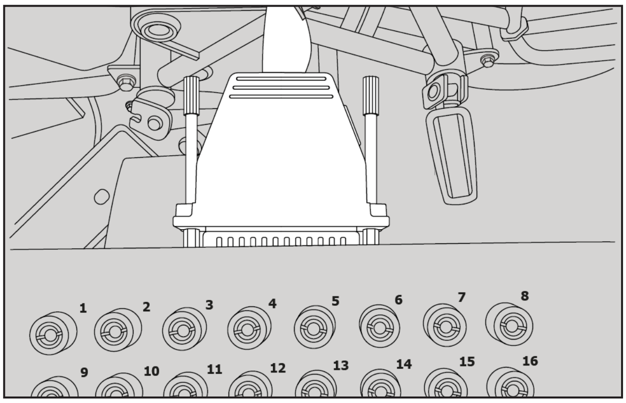
- Disconnect ECU coupler.



- Disconnect Engine oil temperature sensor coupler.



- Connect ECU breakout box harness coupler to Breakout box harness (62 Pin Kit)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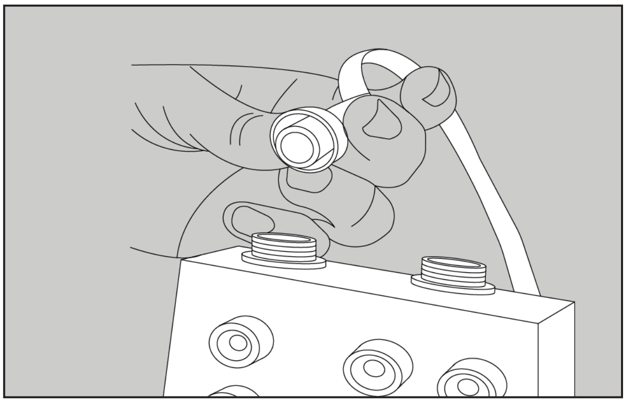
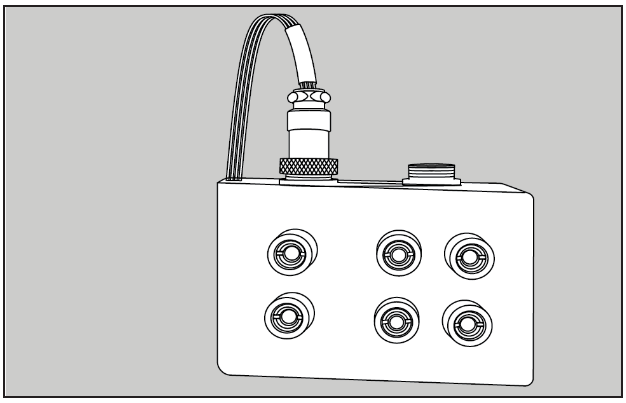
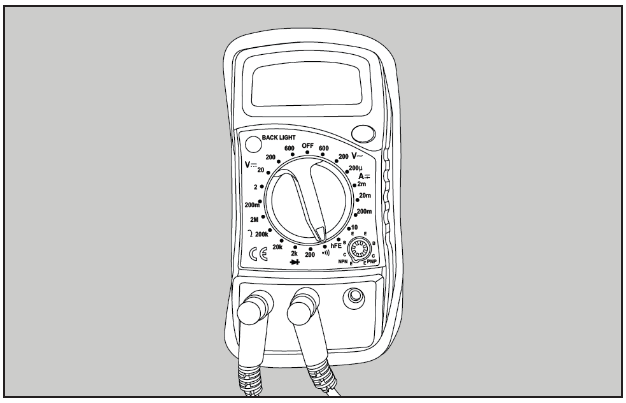
- Connect Engine oil temperature sensor breakout box harness to Sensor break out box.



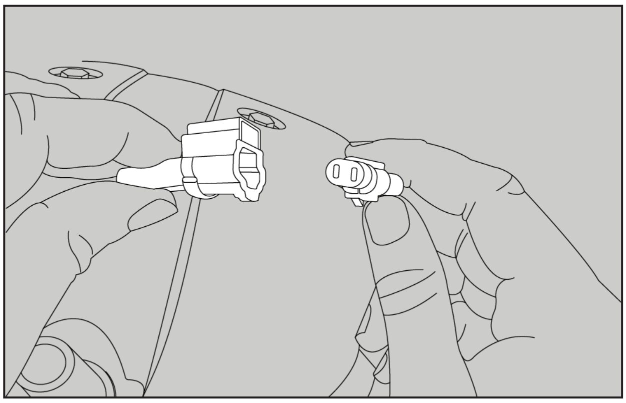


a. To check Continuity of Wiring harness

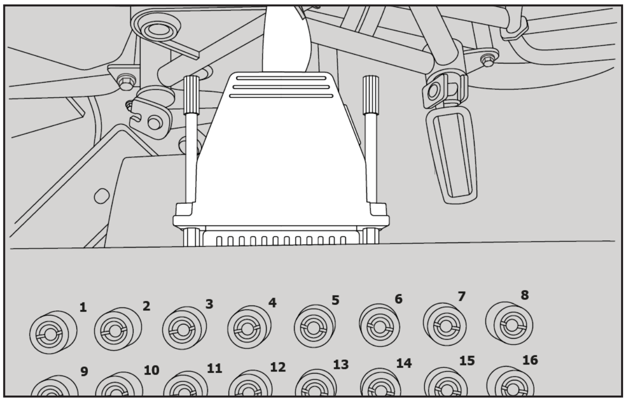
- Keep the multimeter in continuity mode


BACK LIGHT
OFF

- Connect the Engine oil temperature sensor breakout wiring harness to sensor wiring harness coupler



- connect the ECU breakout box harness to ECU wiring harness coupler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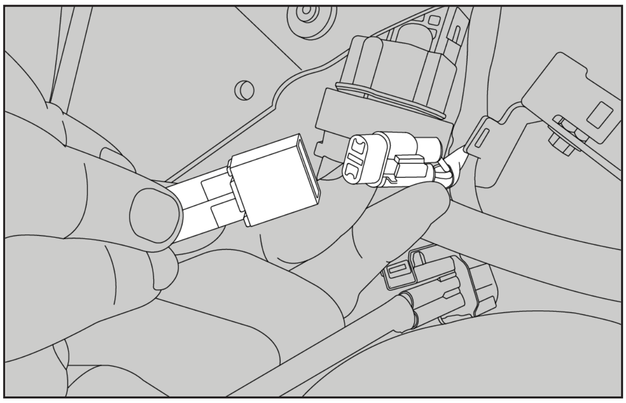
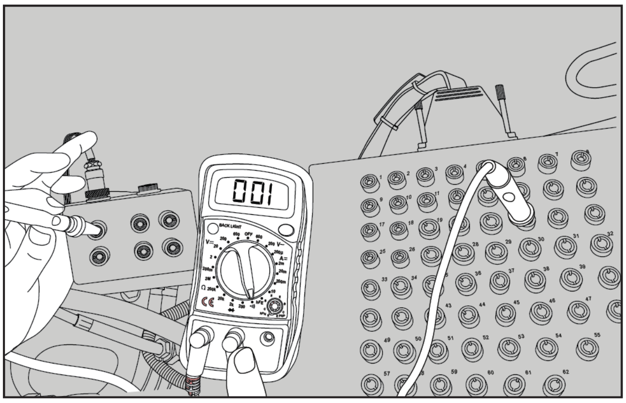
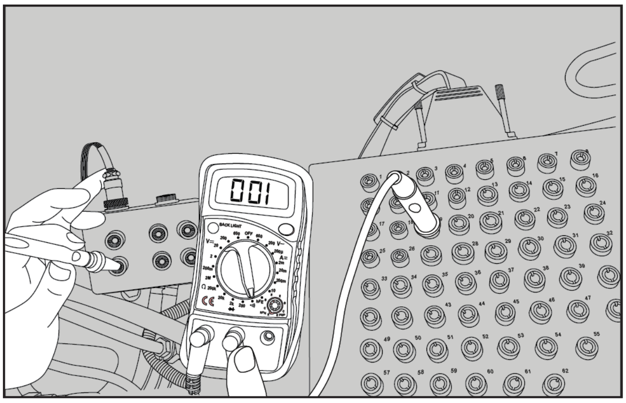


- Keep the multimeter positive probe in socket 1 of the sensor break outbox and negative probe in socket 22 of the ECU breakout box. Check for continuity (Beep Sound from the multimeter)

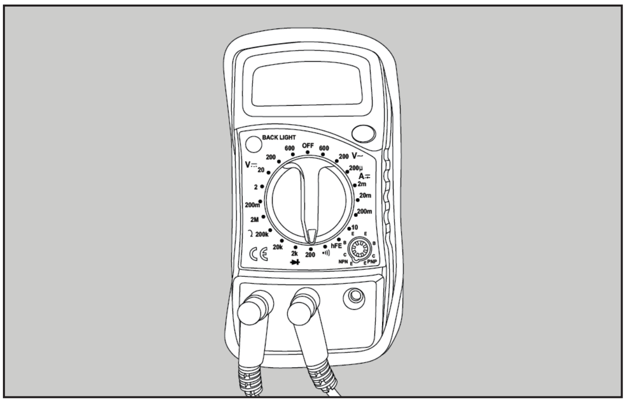


- Keep the multimeter positive probe on socket 2 of the sensor break outbox and negative probe on socket 19 of the ECU breakout box. Check for continuity (Beep Sound from the multimeter)

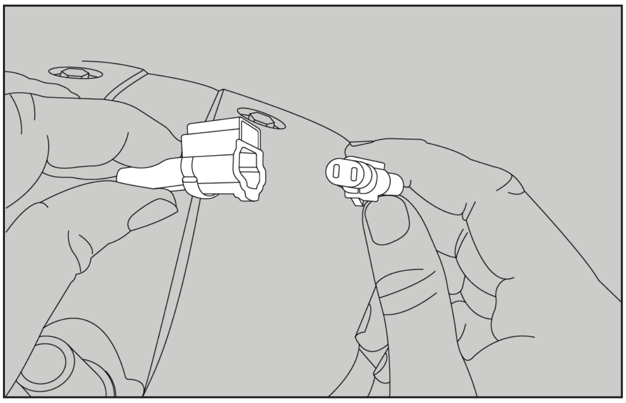


b. To check the resistance of Sensor

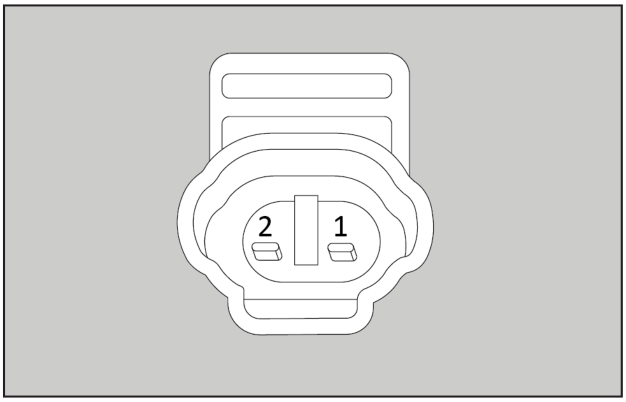
- keep the multimeter in Resistance mode (200 Ohms)

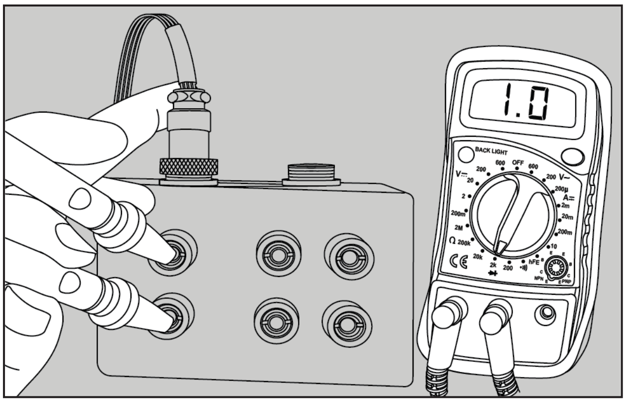


- Connect the Engine oil temperature Sensor break out box harness to Engine oil temperature sensor coupler



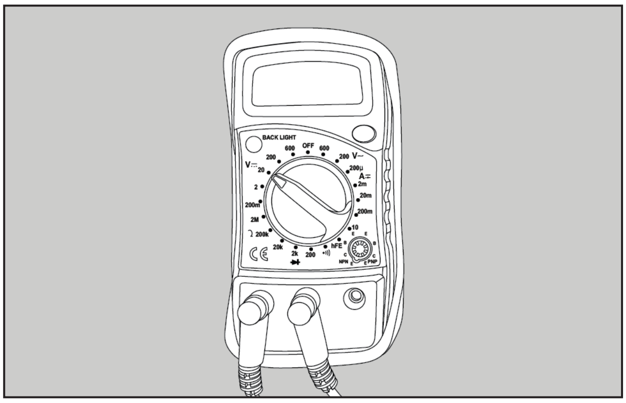
- To check the Resistance value of the engine oil temperature sensor, connect the multimeter in Socket 1 and Socket 2 of the breakout box - 2P +4P Pin kit. The resistance value is to be between 3.09kΩ to 75.88kΩ considering a range of - 20 Deg C to + 60 Deg C without warm-up condition.
- After Engine warm-up for 3 minutes and then check the resistance between Socket 1 and Socket 2 the resistance value is to be less than 1.5 KΩ.



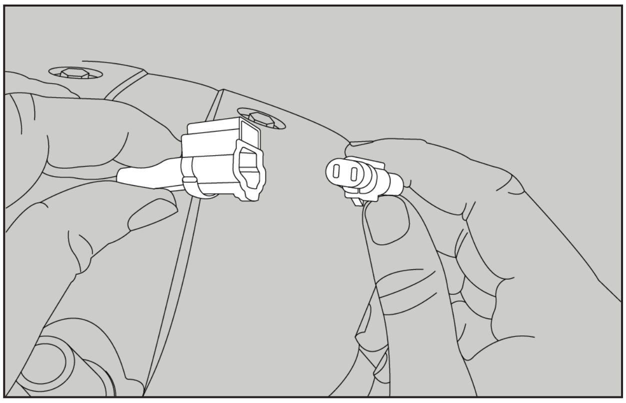


C. To check output voltage

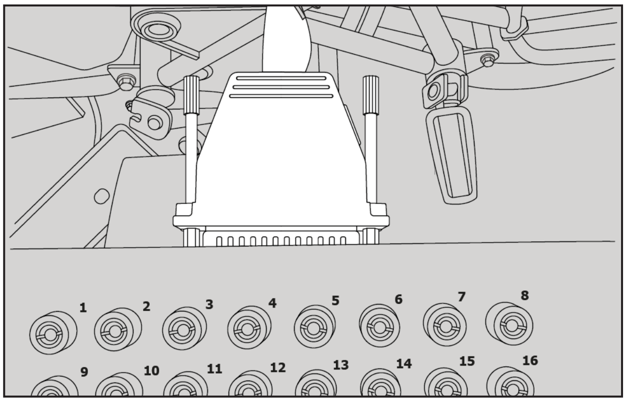
- Keep the multimeter in voltage mode (20V)


BACK LIGHT
OFF
V
A
CE

- Connect the Engine oil temperature sensor breakout wiring harness to Engine oil temperature sensor wiring harness coupler.



- Ensure the ECU break out box harness is connected to ECU coupler and ECU wiring harness coupler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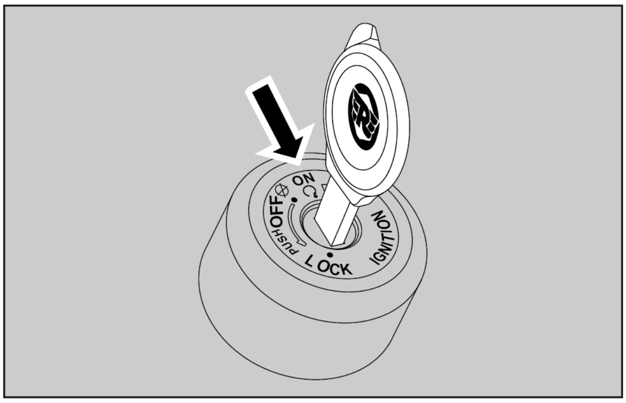
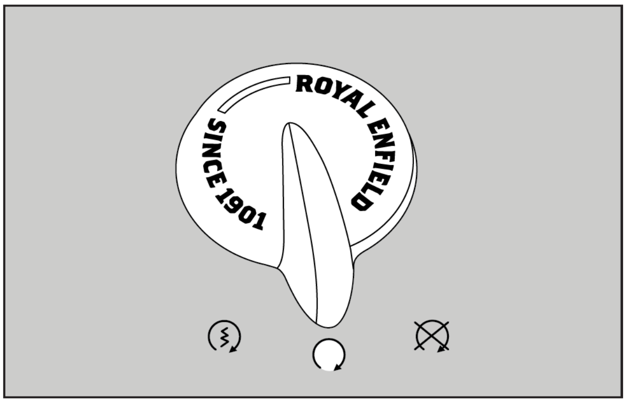
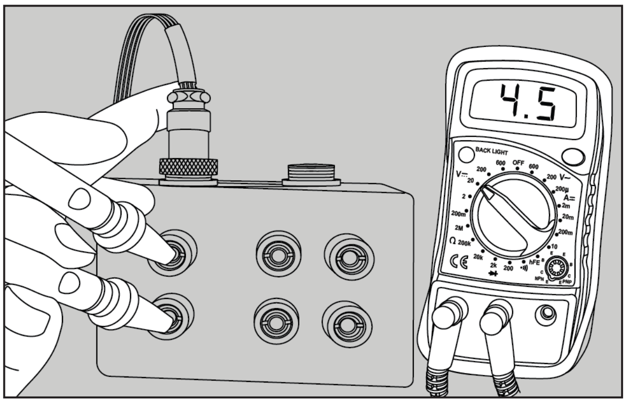
- Turn the Ignition and kill switch "ON"

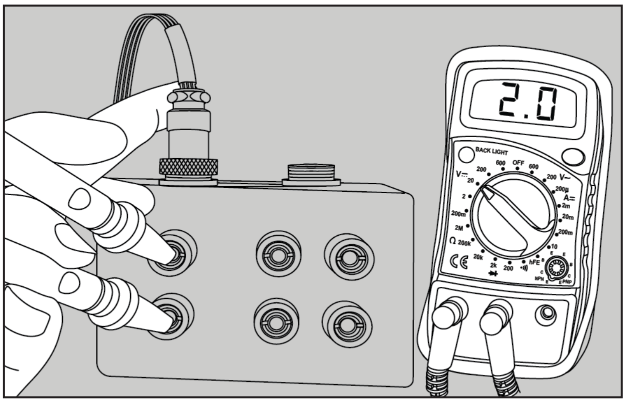

ON
PUSH
OFF
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the engine and keep it in idle RPM
- Place the multimeter positive probe in Socket 2 of sensor break out box (2P+4P) and negative probe in socket 1 of sensor break outbox
- Check the voltage when the engine temperature is equal to ambient temperature (without engine warm-up). Voltage should be 3.1V to 4.87 V (- 20 Deg C to 60 Deg C)


4.5
BACK LIGHT

- Check the voltage when the engine is warmed up for 3 minutes with half throttle Voltage should be less than 2.25 V



d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (3.09kΩ to 75.88kΩ) and without engine warm-up (less than 1.5 K Ohms), you replace with Engine oil temperature Sensor
- If the voltage is not meeting the specified limit (between 3.1V to 4.87 V (- 20 Deg C to 60 Deg C) or if 5 V is observed and if continuity is available you have to replace the ECU.
- If the voltage is not meeting the specified limit (less than 2.25V at engine warm-up) or if 5V is observed and if continuity is available you have to replace the ECU.

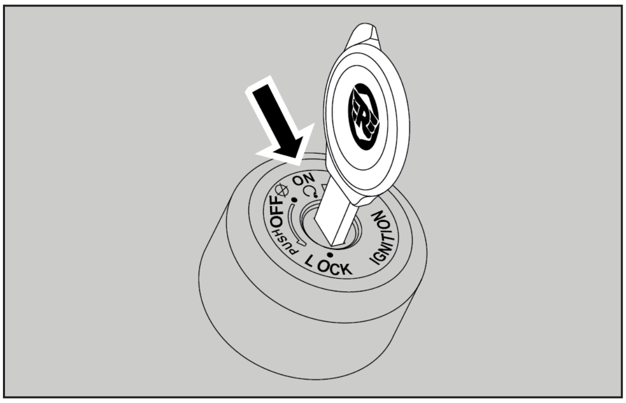
(Engine oil temperature Sensor/ Wiring harness & ECU Removal and refitment procedure will be provided here from service manual as hyperlink)

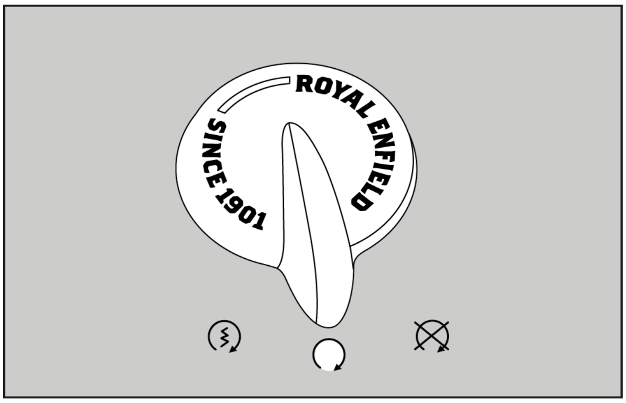
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





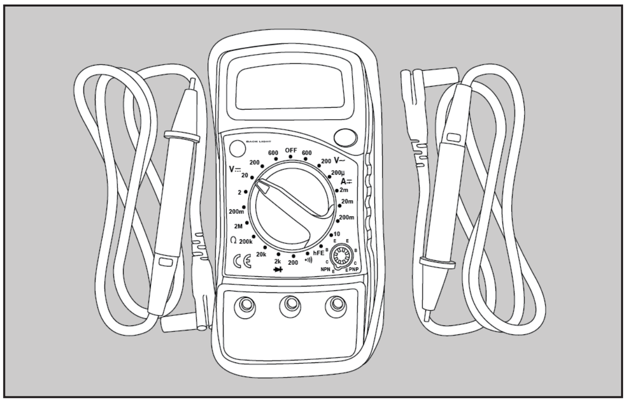
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and need to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

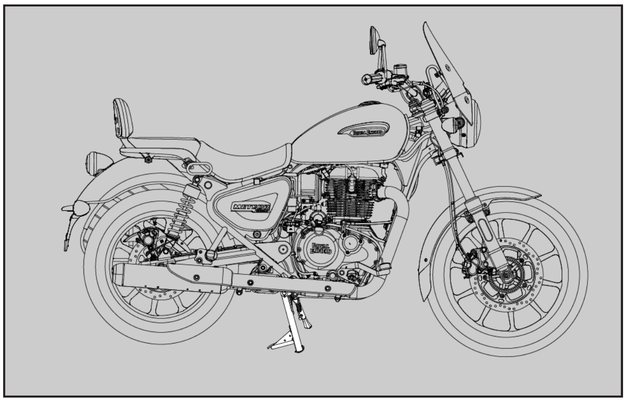


- Test lead wire (90 SERIES - ORANGE Color Wire) for Sensor
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (It will be given as hyperlink)

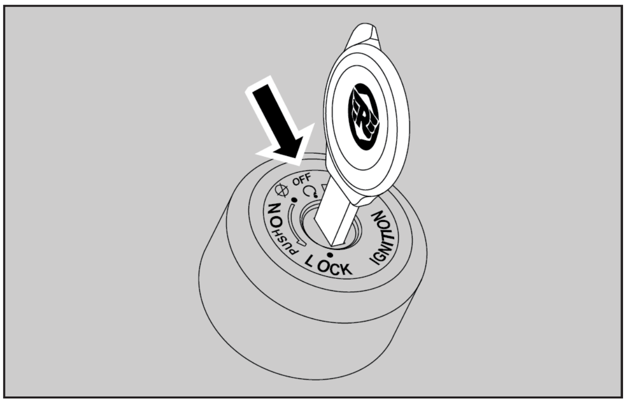
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

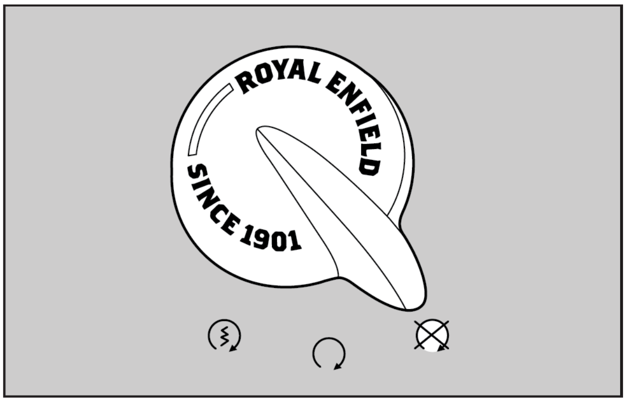
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

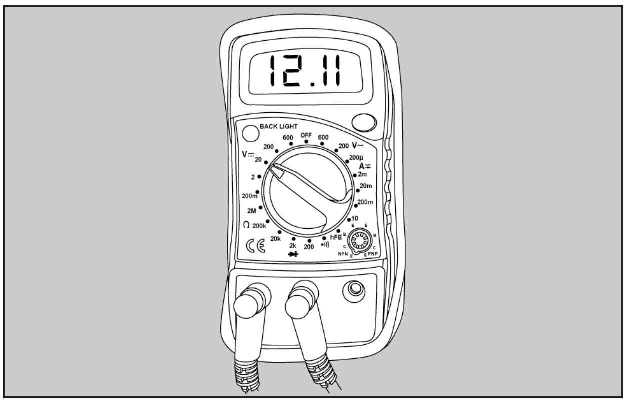


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring the above precondition only you are advised to proceed for the diagnosis steps.

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers

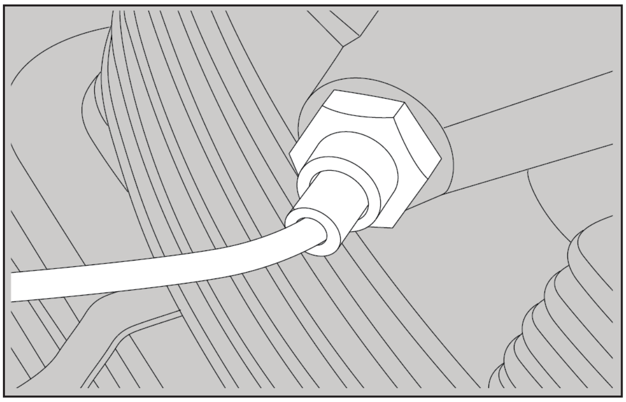
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Engine oil temperature Sensor*

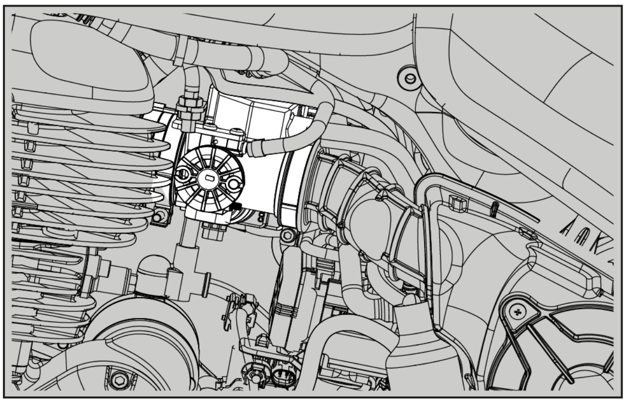
NOTE

- *Removal & refitment of Seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

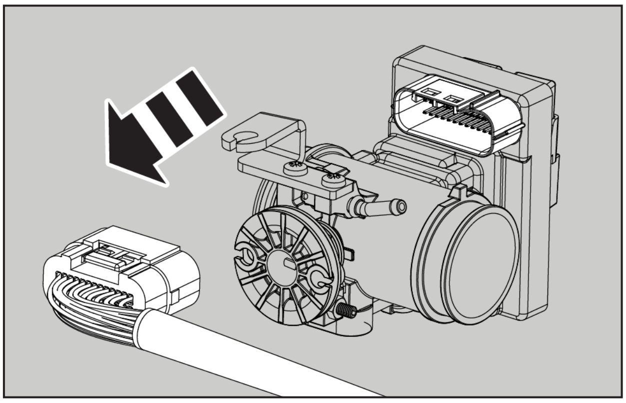
- Engine oil temperature sensor is located in the cylinder head



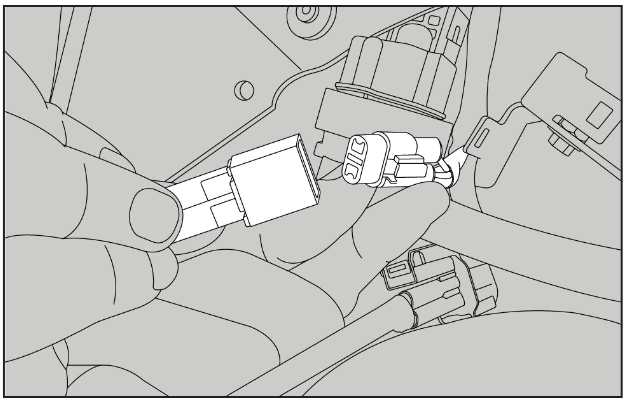
- ECU is located on the throttle body

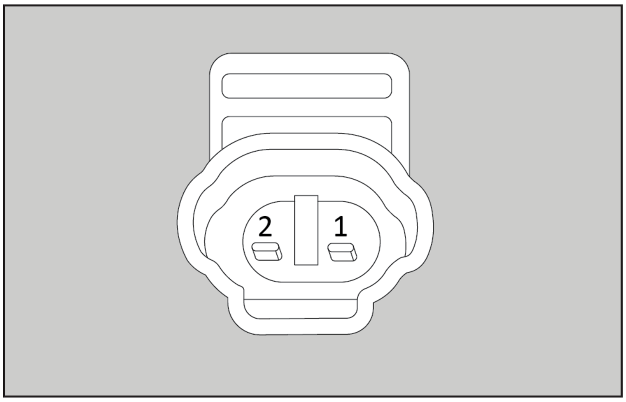


- Disconnect the ECU wiring harness coupler from ECU



- Disconnect the Engine oil temperature sensor Coupler

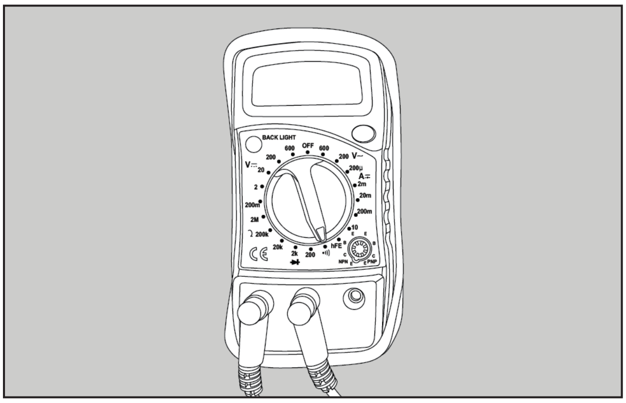




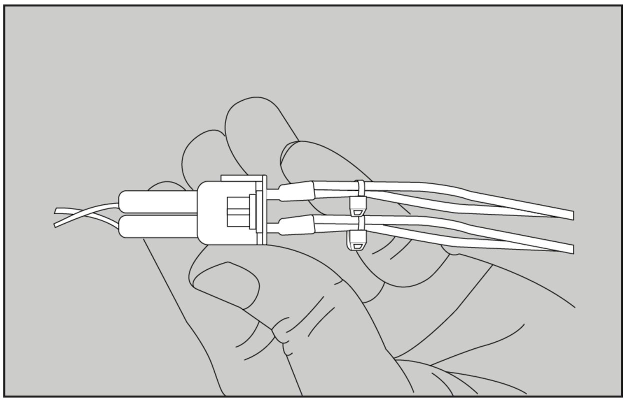
To check Continuity of the Wiring Harness

STEP 1:

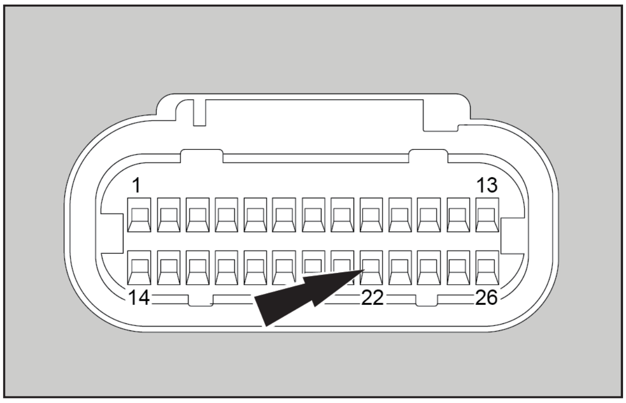
- Keep the multimeter in continuity mode



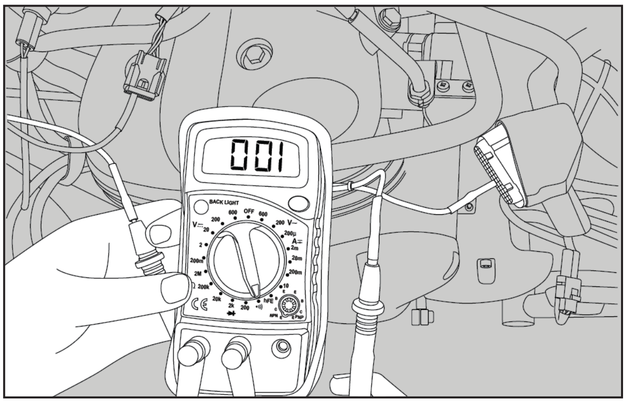
- Connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor wiring harness socket.



- Connect test lead wire 40 series (yellow color) with the black tag to Pin 22 of the ECU harness socket.

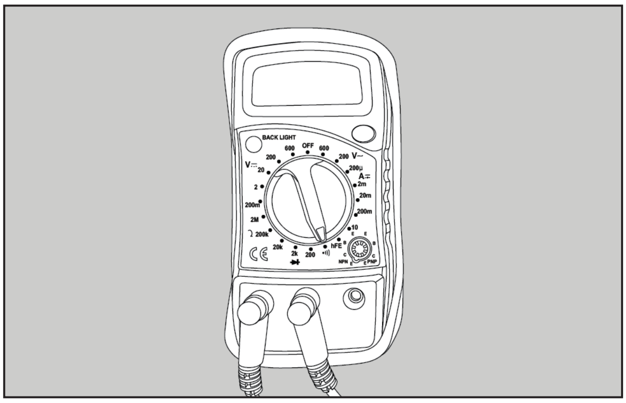


- Check for continuity (Beep Sound from the multimeter)

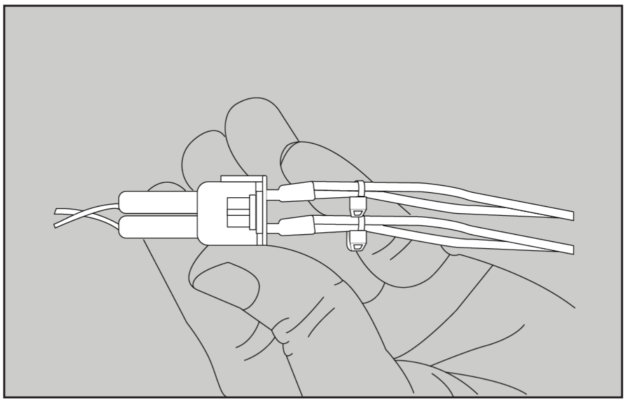


STEP2:

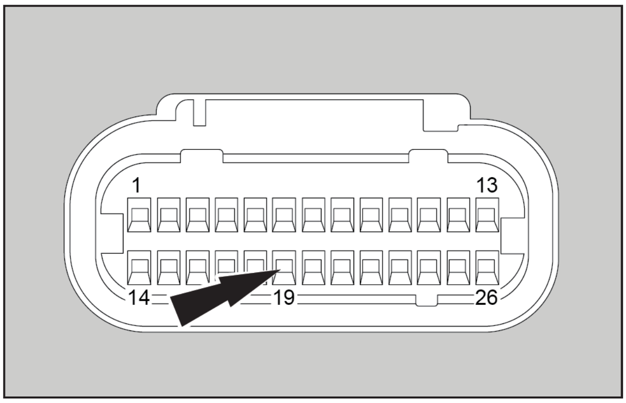
- Keep the multimeter in continuity mode



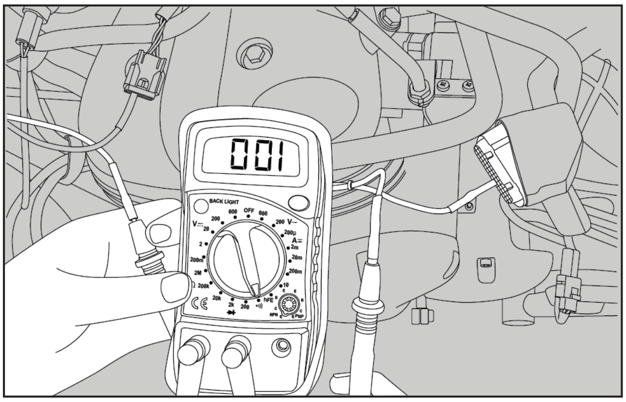
- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the sensor wiring harness socket



- Connect test lead wire 40 series (yellow color) with the red tag to Pin 19 of the ECU harness socket.



- Check for continuity (Beep Sound from the multimeter)

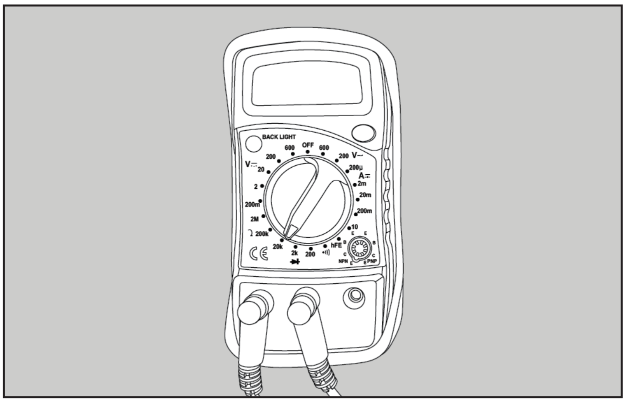


⚠ CAUTION

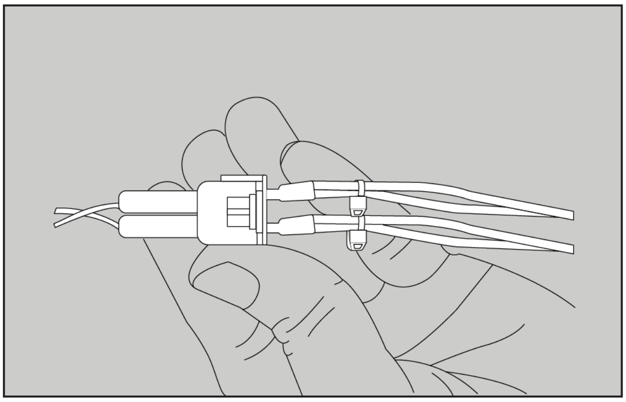
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

b. To check Resistance of the Sensor

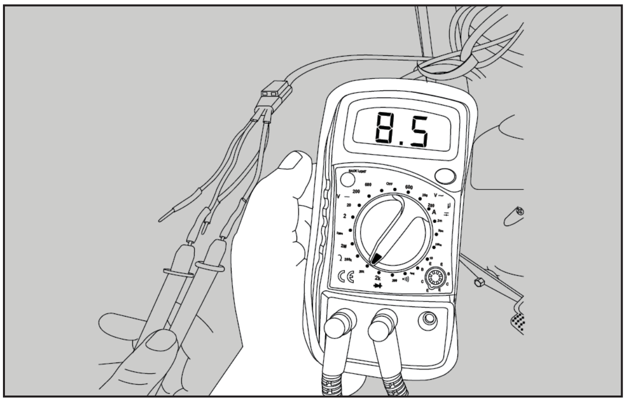
- Keep the multimeter in resistance mode (20K ohm)



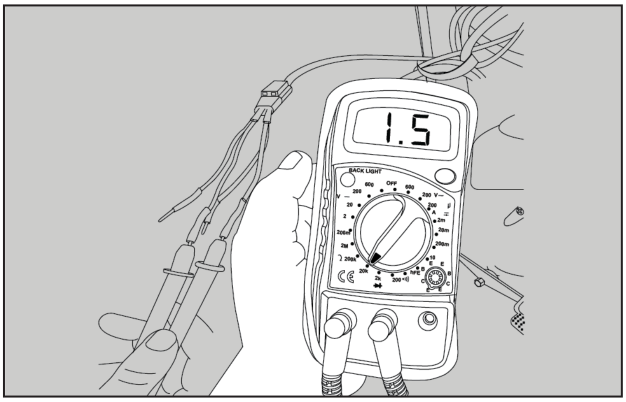
- Connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor socket and connect test lead wire 90 series (orange color) with the red tag to pin 2 of the sensor socket



- Check the Resistance between Pin1 and Pin 2. Resistance value to be between 3.09kΩ to 75.88kΩ considering a range of - 20 Deg C to + 60 Deg C (Condition: without engine warm-up condition)



- Check the Resistance between Pin1 and Pin 2. Resistance value to be less 1.5 K ohm at Engine warm-up condition (Condition: 3-minute warmup with half throttle)

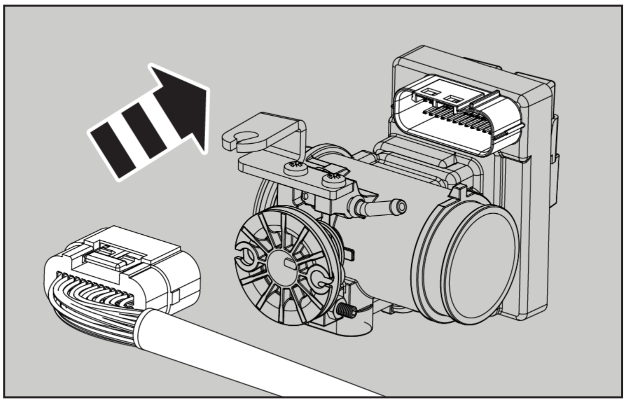


⚠ CAUTION

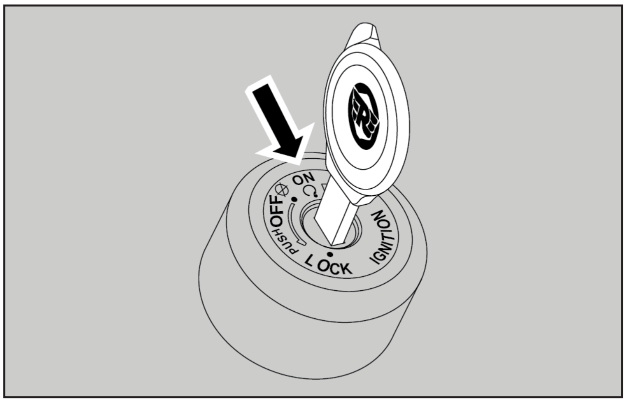
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

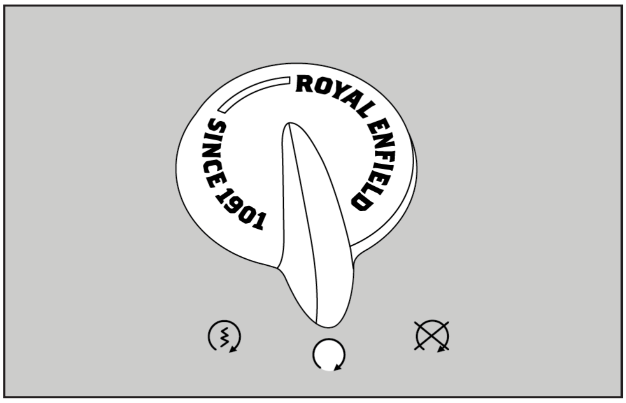
c. To check the Output voltage

- Connect the ECU coupler to ECU

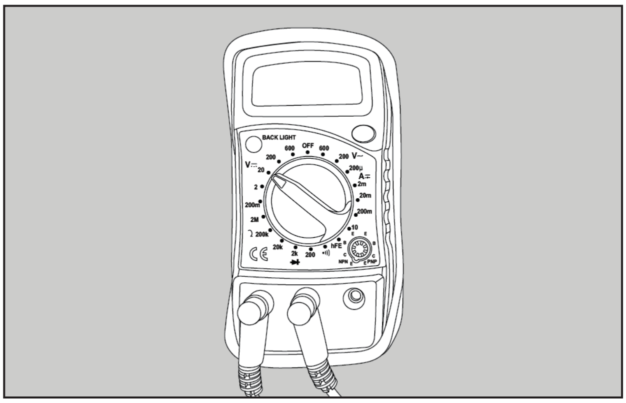


- Turn "ON" the Ignition and kill switch

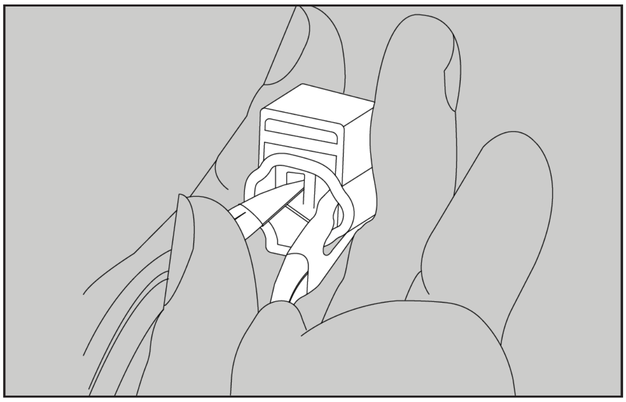

ON
OFF
PUSH
LOCK
IGNITION

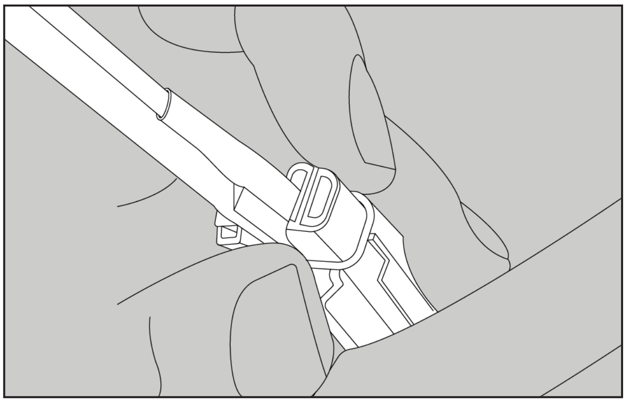

ROYAL ENFIELD
SINCE 1901

- Keep the multimeter in Voltage mode (20 V)

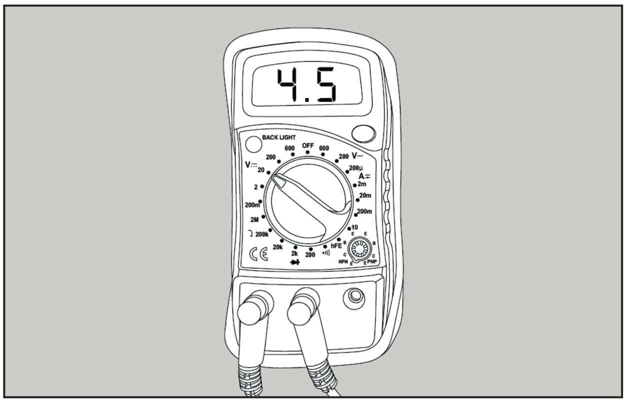

BACK LIGHT
OFF
600
200
V
20
2
200m
2M
200k
20k
2k
hFE
A
20m
10

- Connect the test lead wire 90 series (orange color) with the black tag in the sensor socket Pin 1 and other test lead wire 90 series (Orange Color) with the red tag in the sensor socket pin2, then connect the other end of the test lead wire in the sensor wiring harness

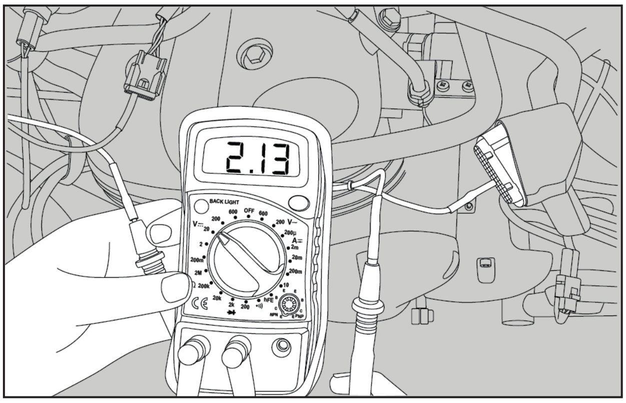




- Place the multimeter positive probe in pin 2 (red tag test lead wire) and negative probe in Pin 1 (black tag test lead wire). Start the engine and keep it in idle RPM
- Voltage should be between 3.1V to 4.87 V (-20 Deg C to 60 Deg C) (Condition: ambient temperature without engine warm-up)


4.5
BACK LIGHT
OFF
600
200
V
20
2
200m
2M
200k
20k
2k
hFE
A
20m
10

- Place the multimeter positive probe in pin 2 (red tag test lead wire) and negative probe in Pin 1 (black tag test lead wire). Voltage should be less than 2.25 V. (Condition: Engine warm-up for 3 mins at half throttle



⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (3.09kΩ to 75.88kΩ) and without engine warm-up (less than 1.5 K Ohms), you replace with Engine oil temperature Sensor
- If the voltage is not meeting the specified limit (between 3.1V to 4.87 V (- 20 Deg C to 60 Deg C) and if continuity is available you have to replace the ECU.
- If the voltage is not meeting the specified limit (less than 2.25V at engine warm up) and if continuity is available you have to replace the ECU.

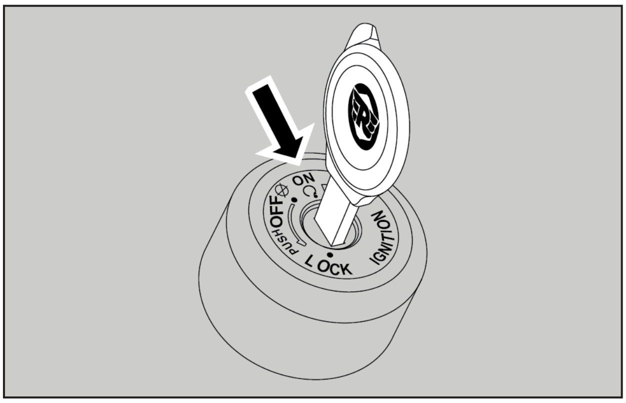
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

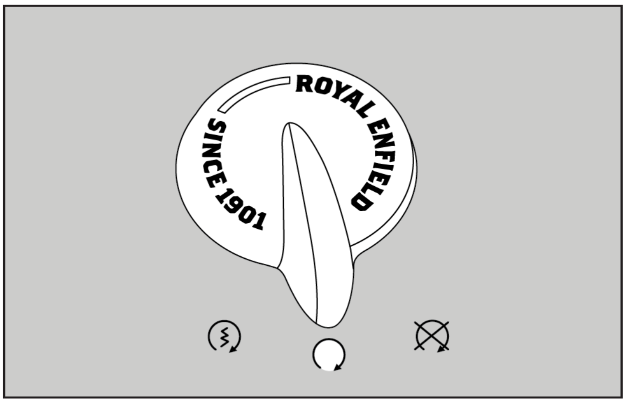
1.3.1. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched “ON”, DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in “ON” Position





- Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0032 - LAMBDA SENSOR HEATER

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0032	Lambda Sensor Heater	Oxygen Sensor Heater Control Circuit High

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P0032

Type of error : Oxygen Sensor Heater Control Circuit high

(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

b.Preliminary Checks (Basic Check Points):

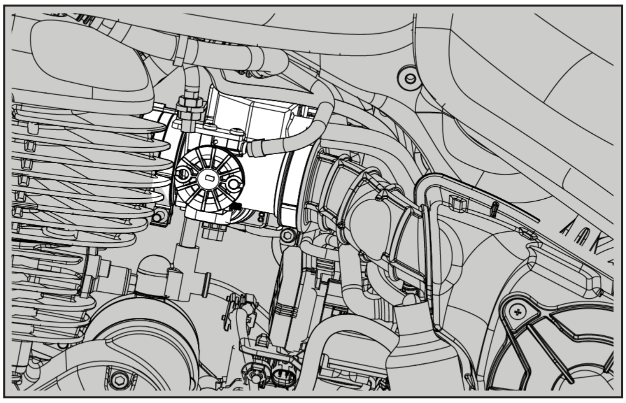
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

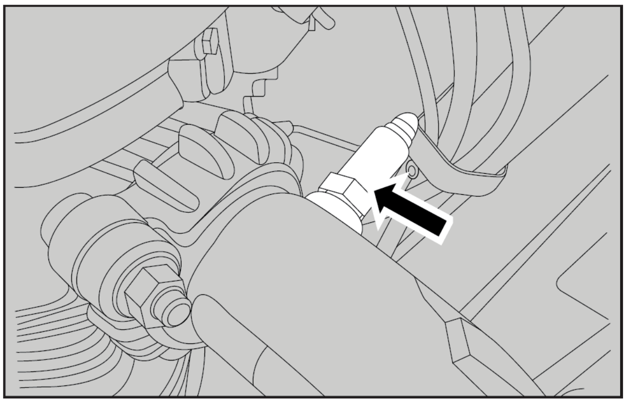
⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

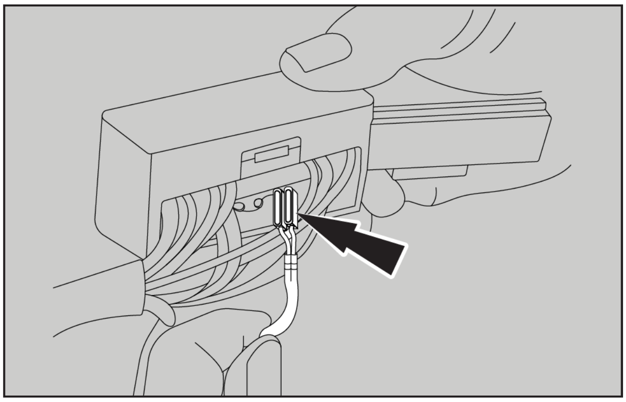
- ECU is located on the throttle body assembly



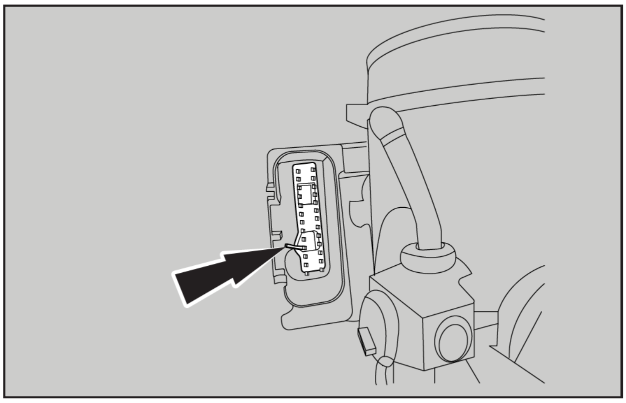
- The lambda sensor is located on the Exhaust pipe



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition “ON” & “OFF”) till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

“ REFRESH DTC OPTION HAS TO APPEAR HERE”

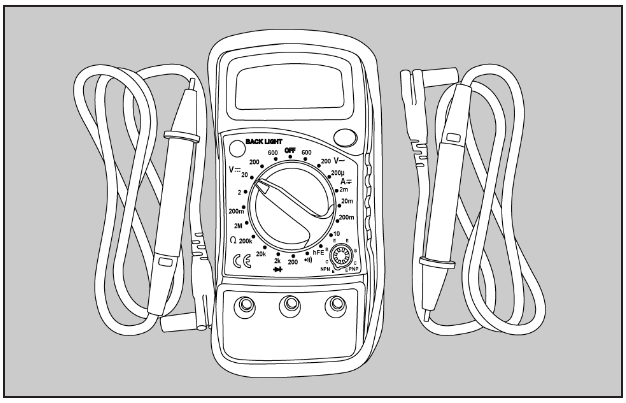
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

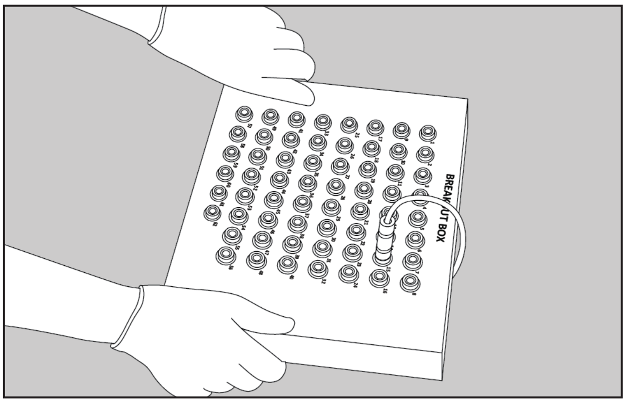
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

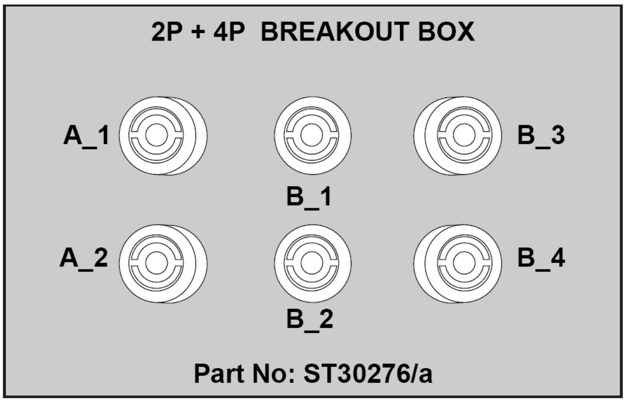
- **Tools Required**
- Multimeter (Universal)



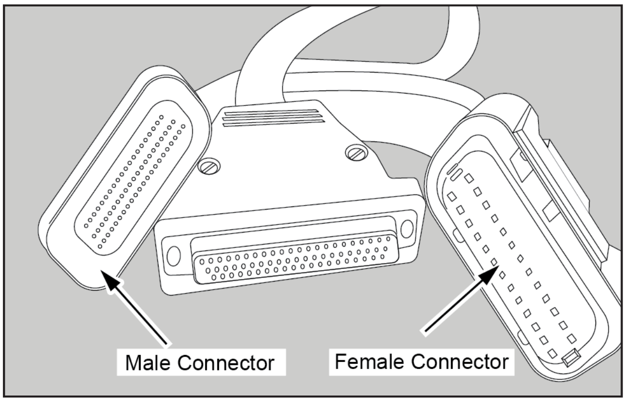
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

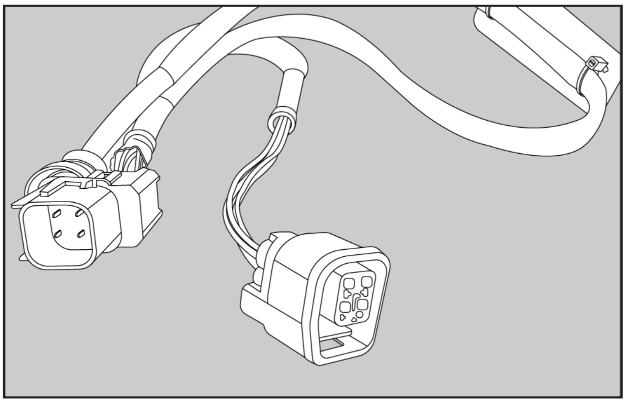
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

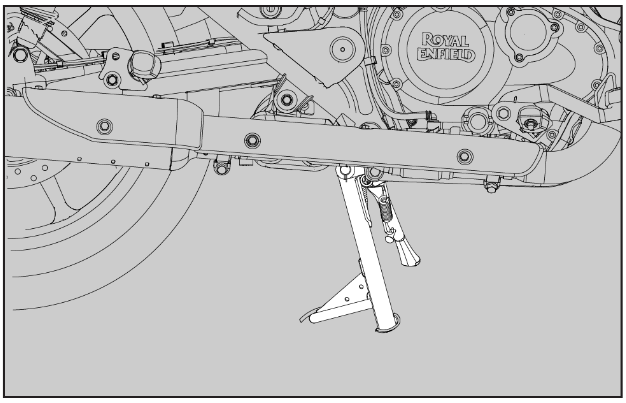

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

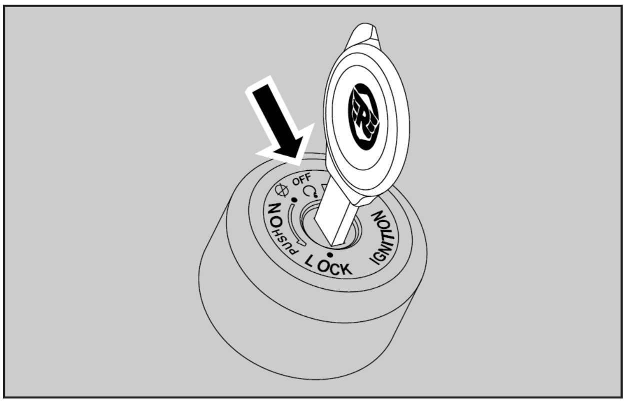


b. Pre-Checks:

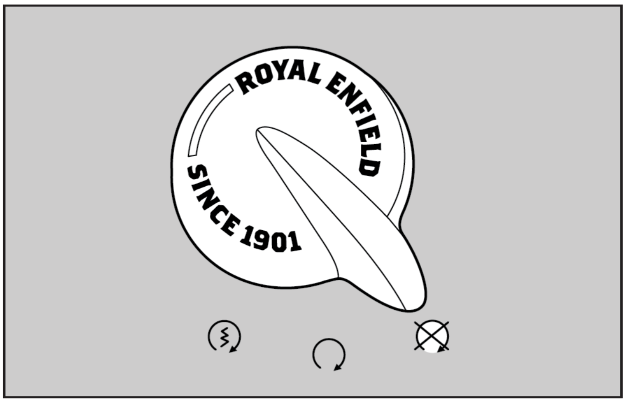
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

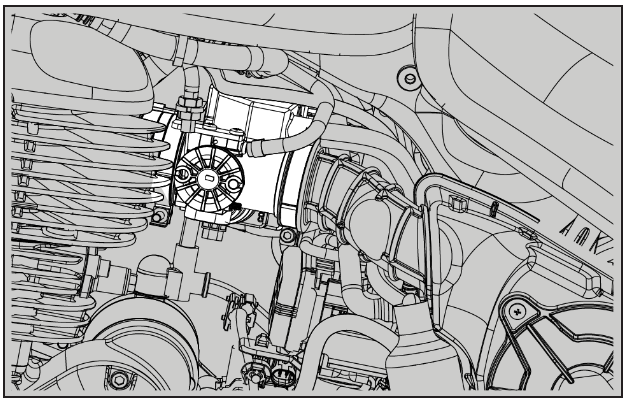
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

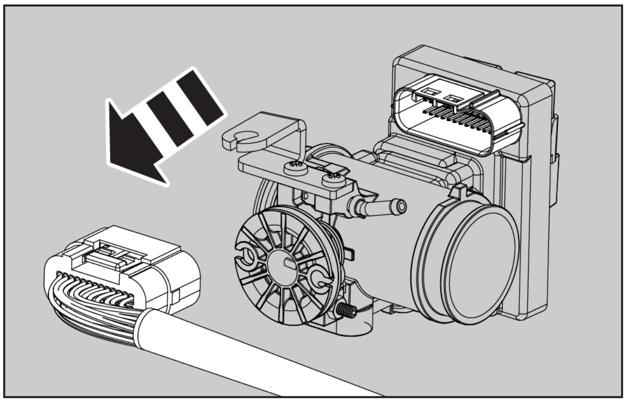
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

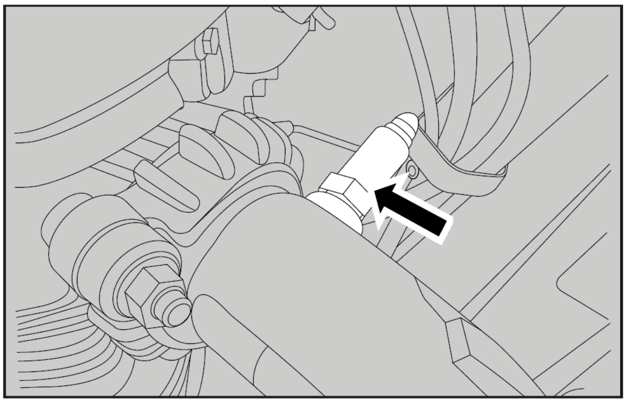
- ECU is located in the throttle body assembly



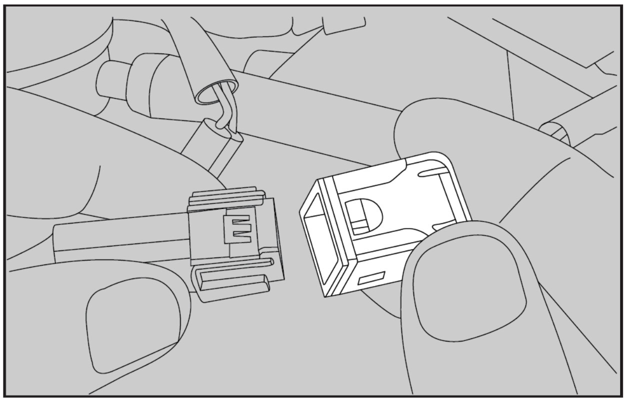
- Disconnect ECU coupler from ECU.



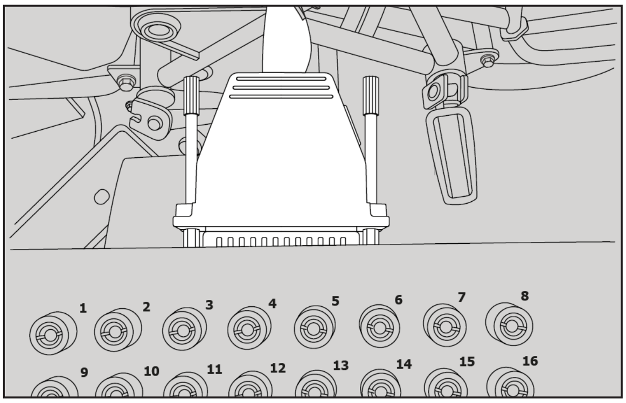
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.



- Connect ECU Breakout box to ECU breakout box harness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2
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11
12
13
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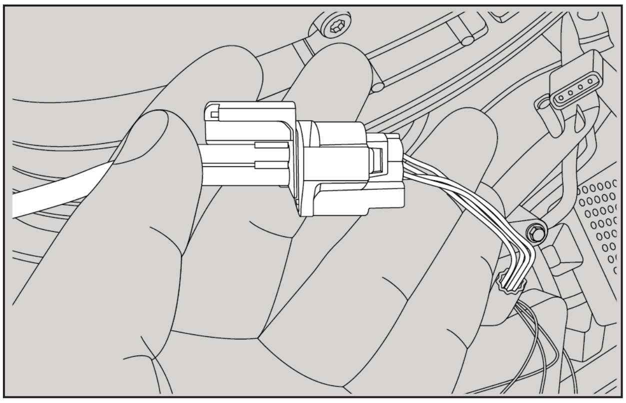
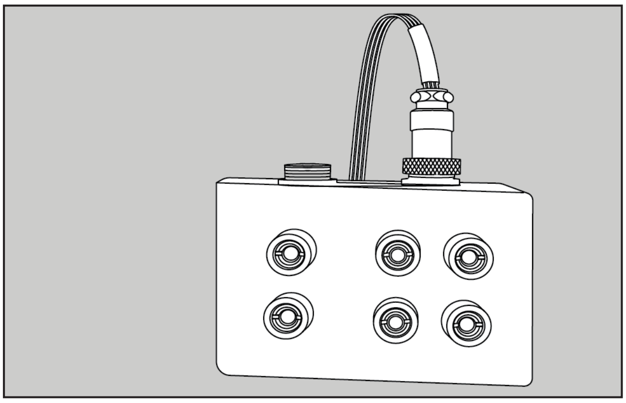
15
16

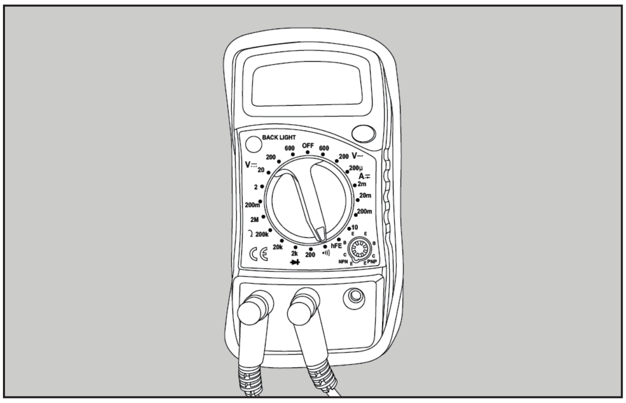
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



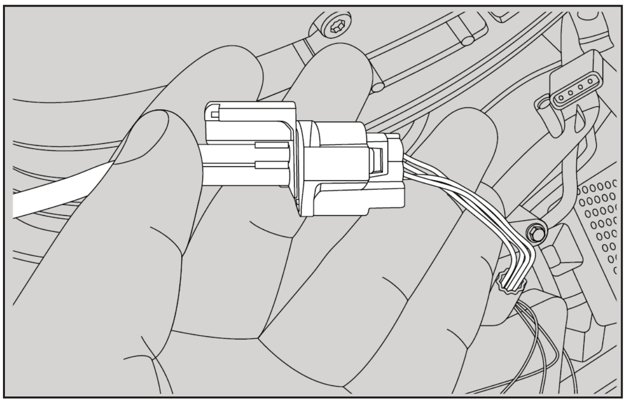


a. To check Continuity of Wiring harness

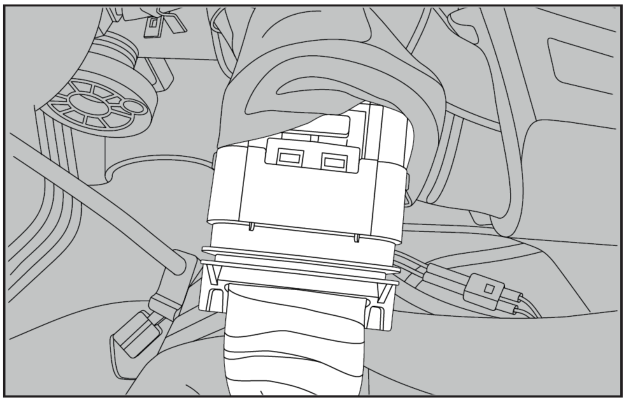
- Keep the multimeter in continuity mode


BACK LIGHT
600
OFF
600
200
V~
200
V⎓
20
200µ
A⎓
2
2m
20m
200m
200m
2M
10
200k
20k
2k
200
hFE
NPN
PNP
E
B
C

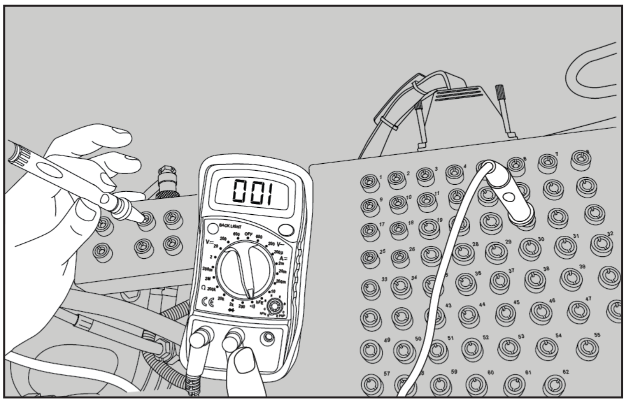
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



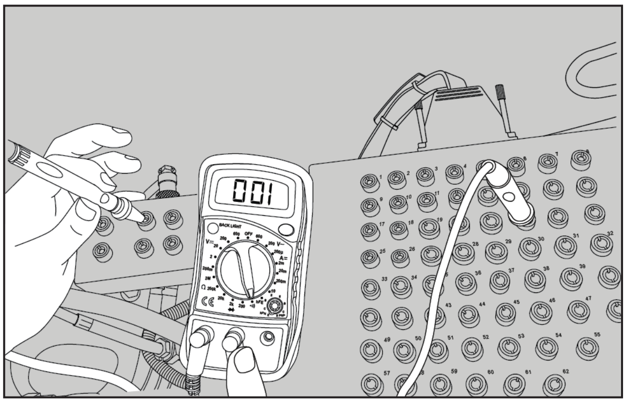
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



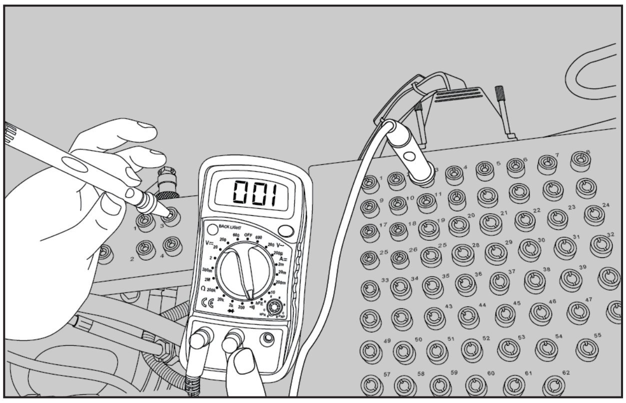
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



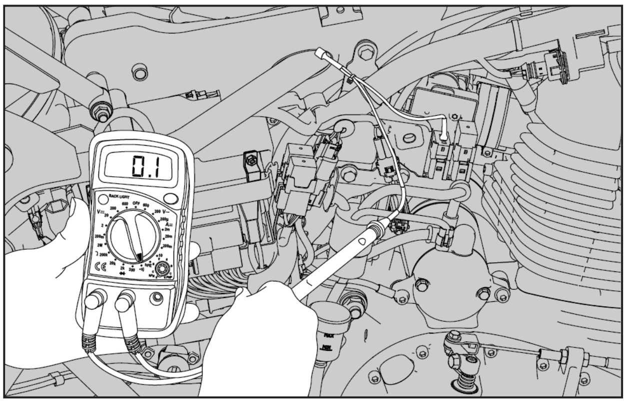
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

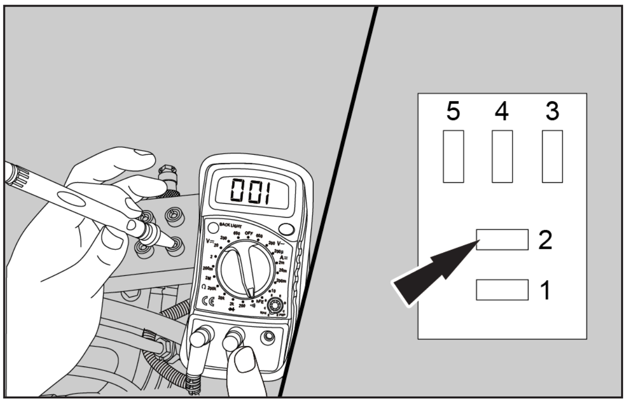


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



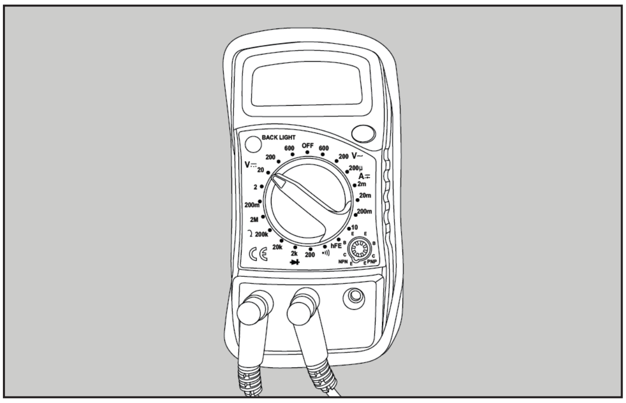
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



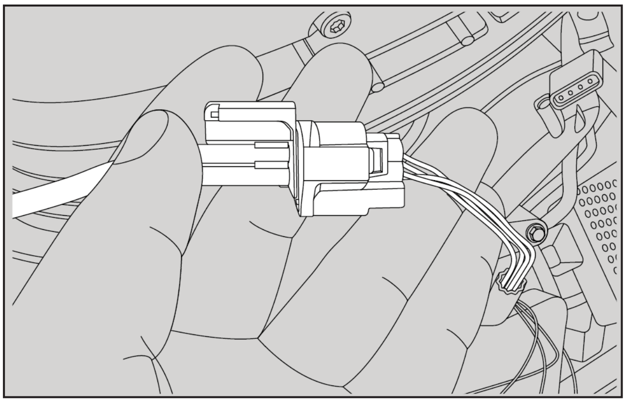


C. To check output voltage

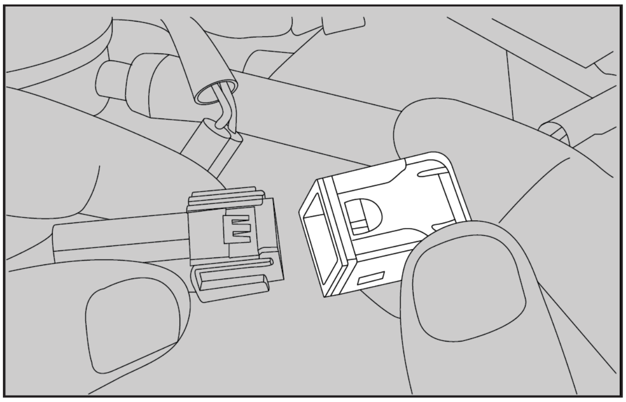
- Keep the multimeter in voltage mode (20V)



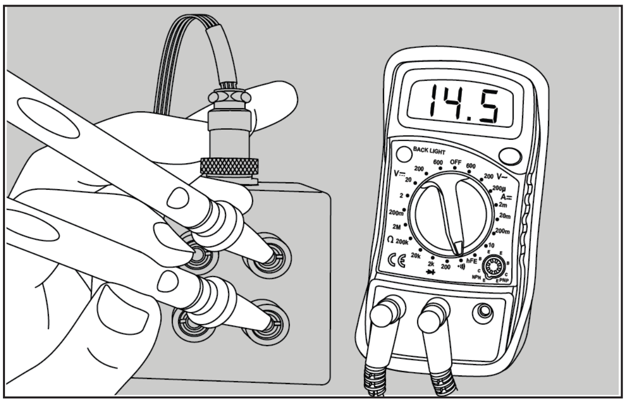
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

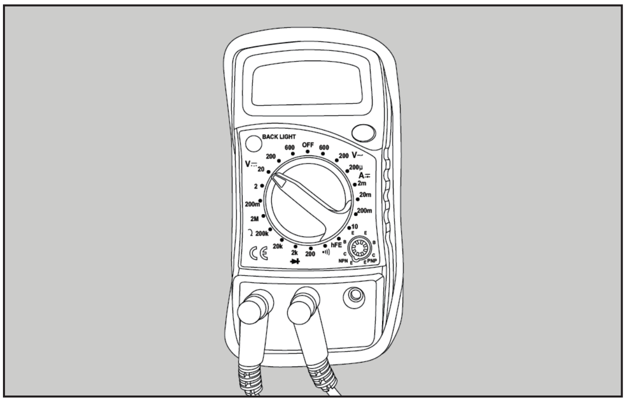


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

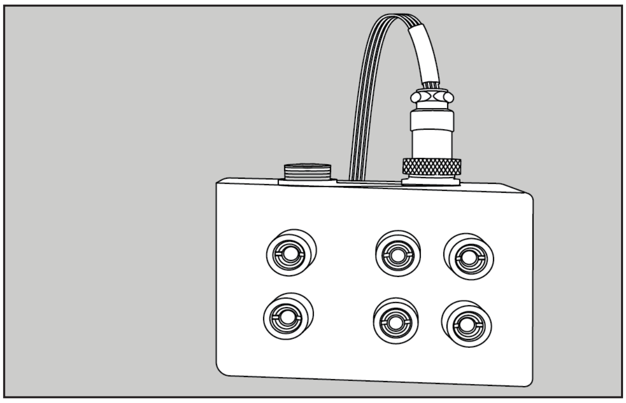


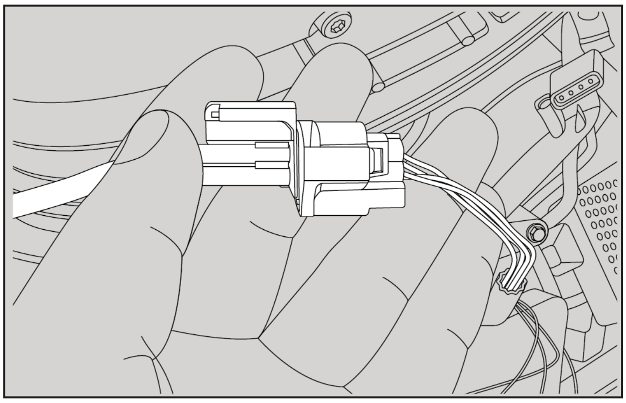
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

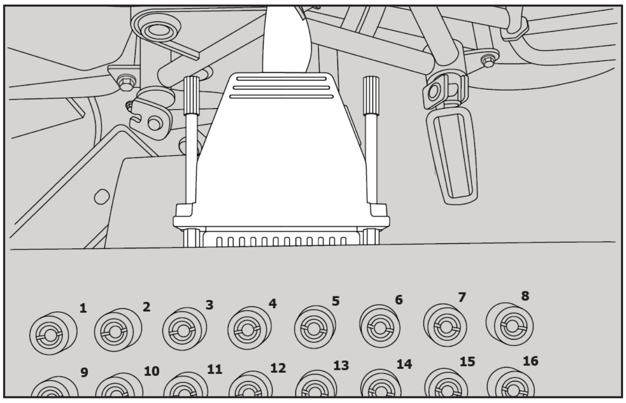


- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler





- Similarly, connect the ECU breakout box to ECU and wiring harness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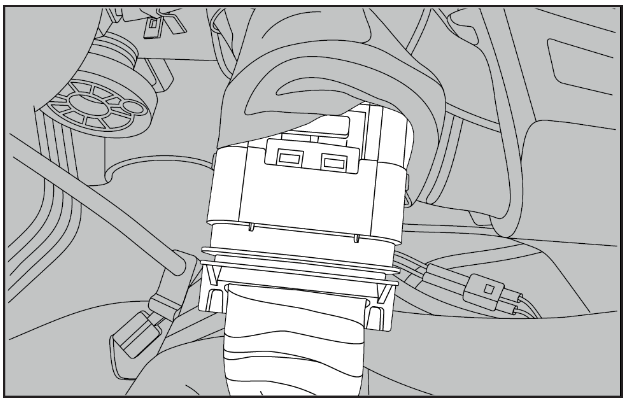
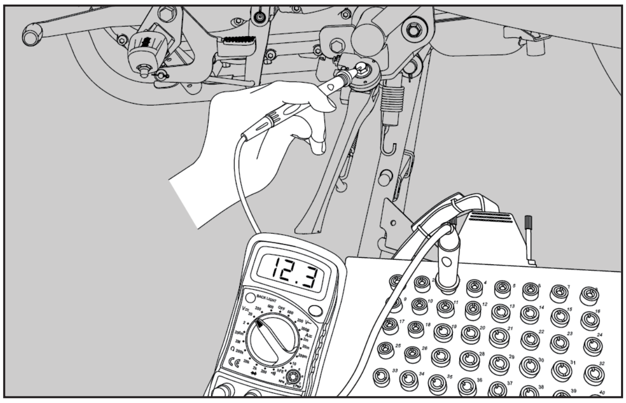
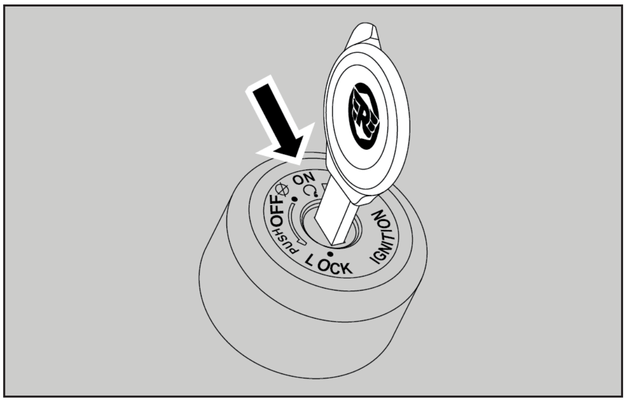
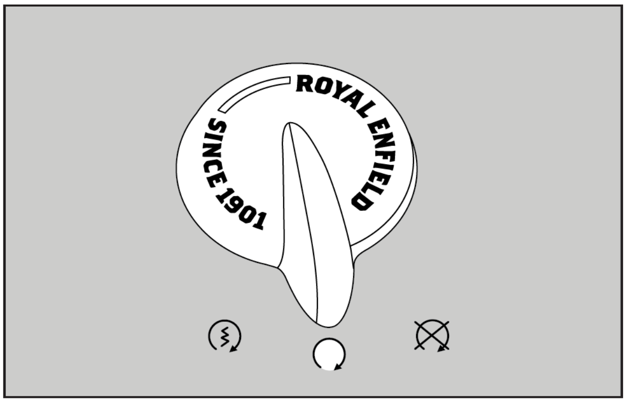


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

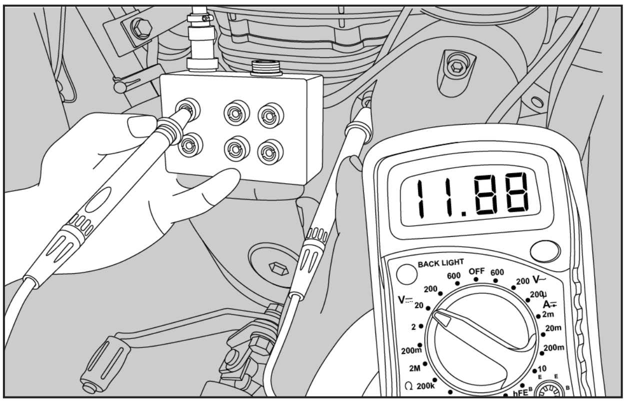


- Turn "ON" the ignition and kill switch


ON
PUSH OFF
LOCK
IGNITION

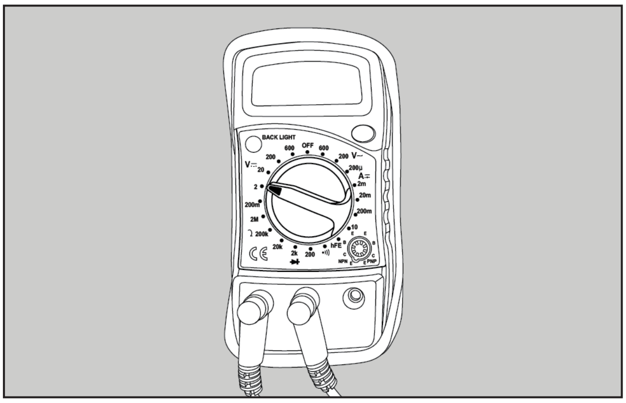

ROYAL ENFIELD
SINCE 1901

- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

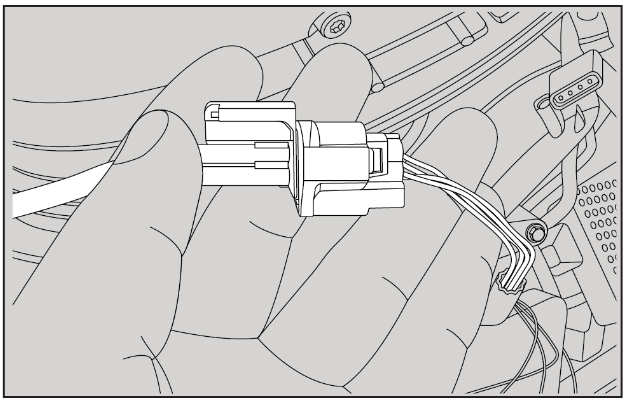

11.88
BACK LIGHT

To Check output voltage check

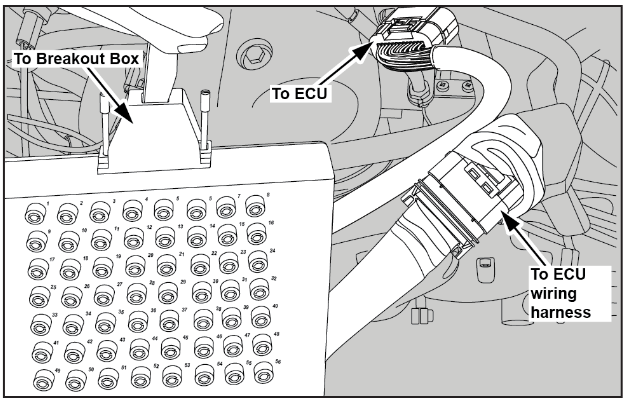
- Keep the multimeter in Voltage mode (2 V).



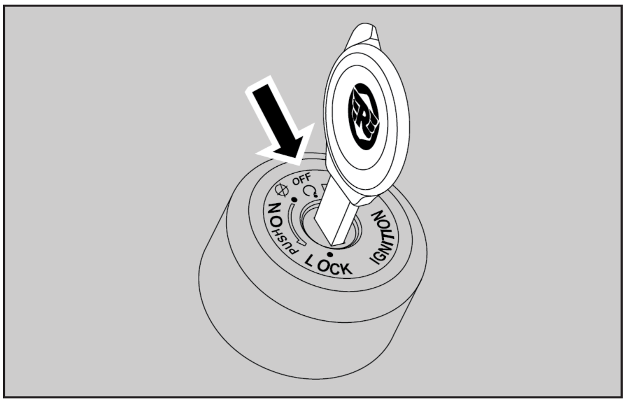
- Connect the female end of the Sensor breakout harness into the sensor coupler

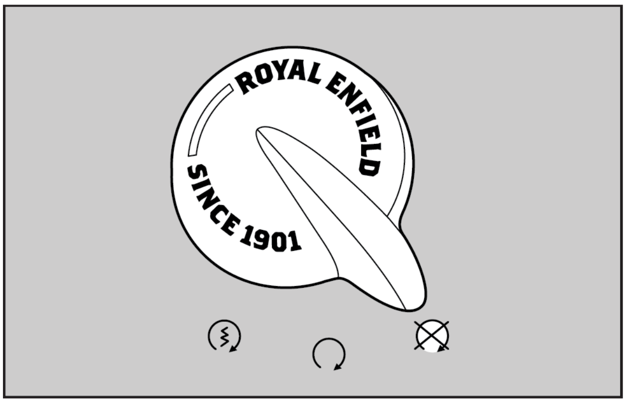


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn “ON” the kill switch and ignition switch

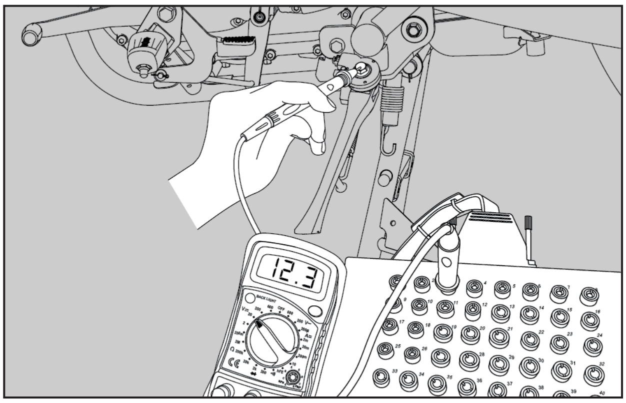

OFF
PUSH ON
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

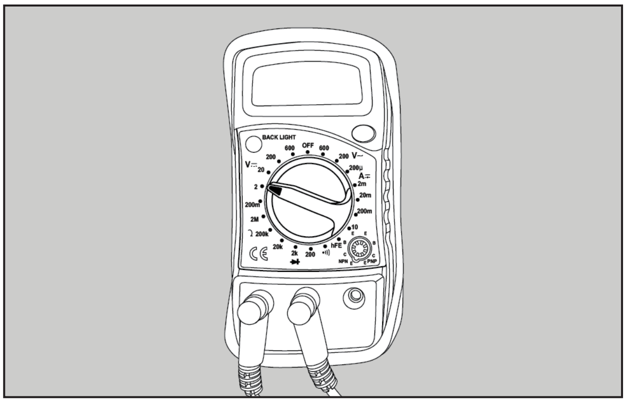
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



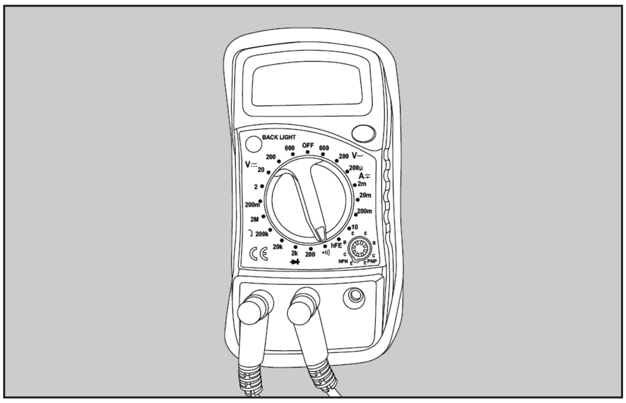
- Switch “OFF” the Engine

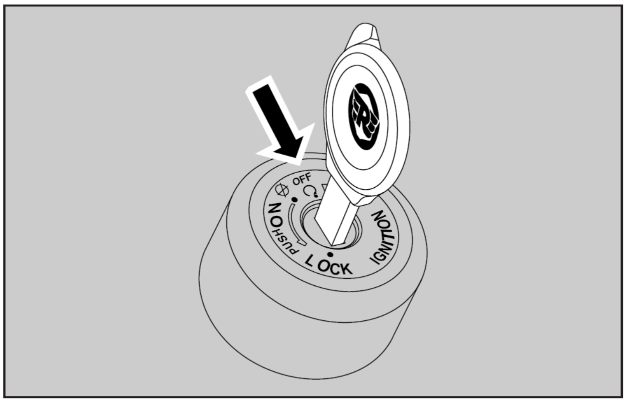
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

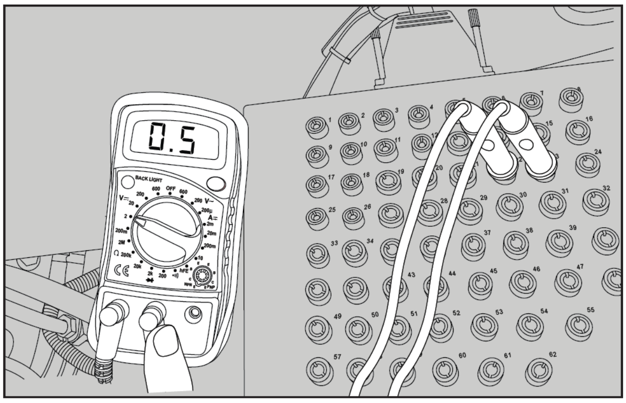


- Turn “ON” the Ignition switch and kill switch





- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU break outbox



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the Heater output voltage is 0V (After 10 sec from engine start) then the issue exists in either Sensor heater or ECU
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), you replace with Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) you have to replace the ECU.

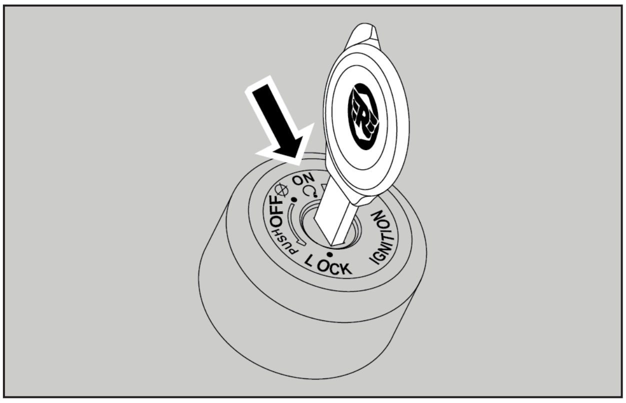
It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

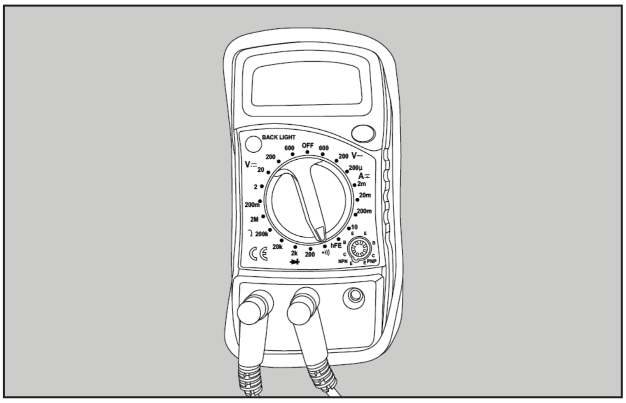
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

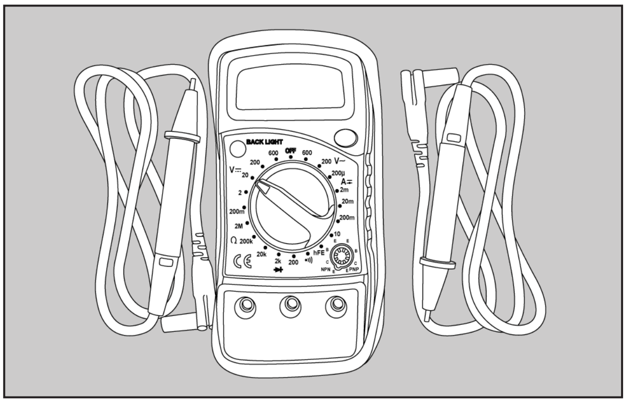
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)



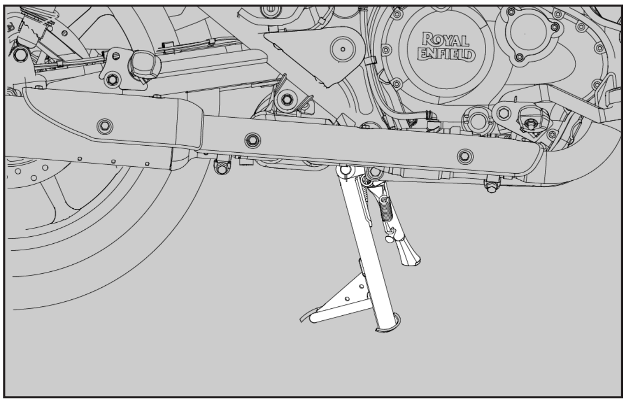
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

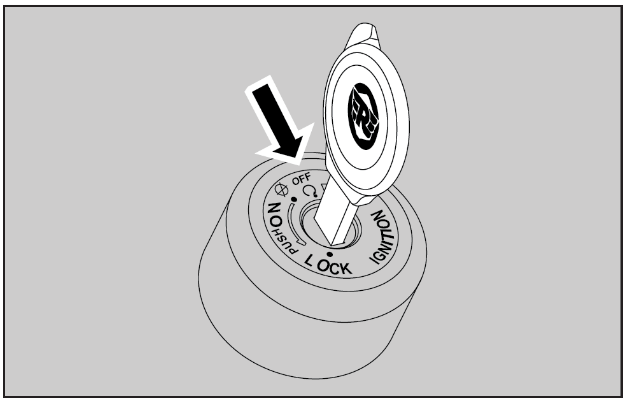
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

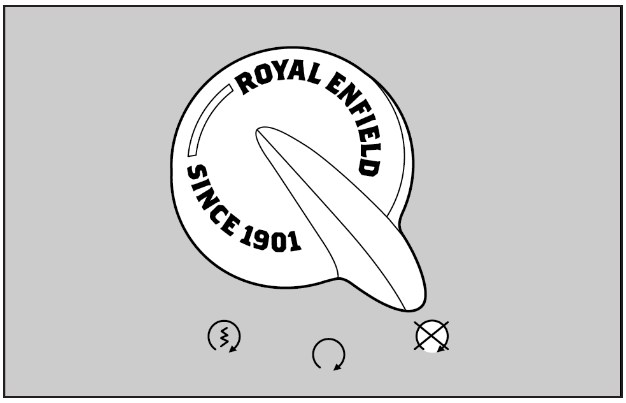
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

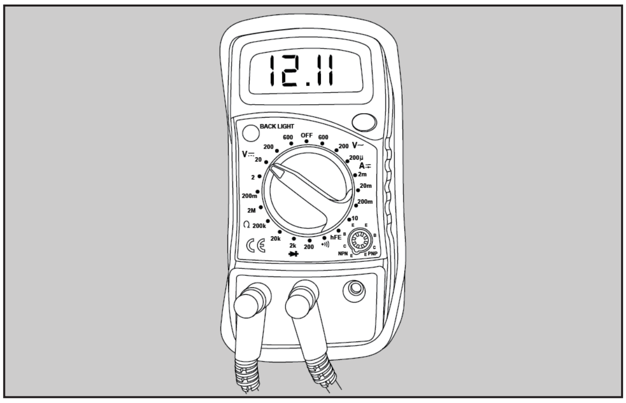


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

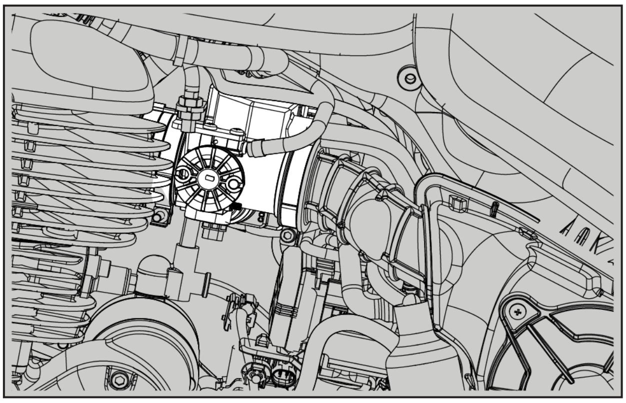
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

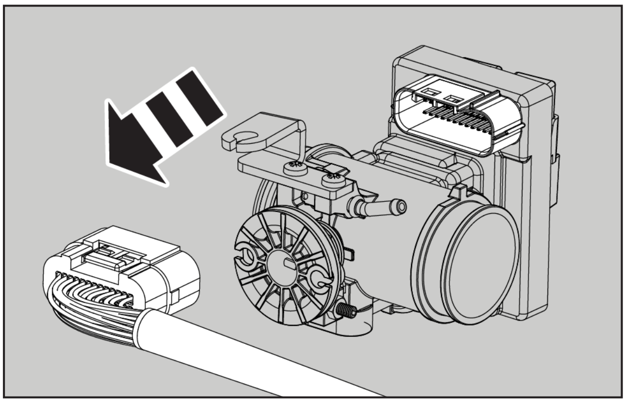
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

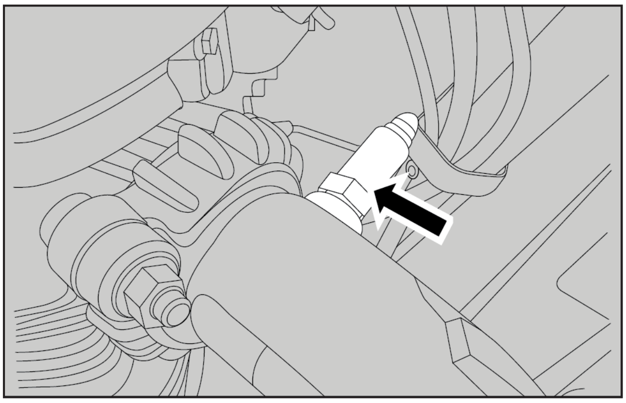
- ECU is located on the Throttle body assembly



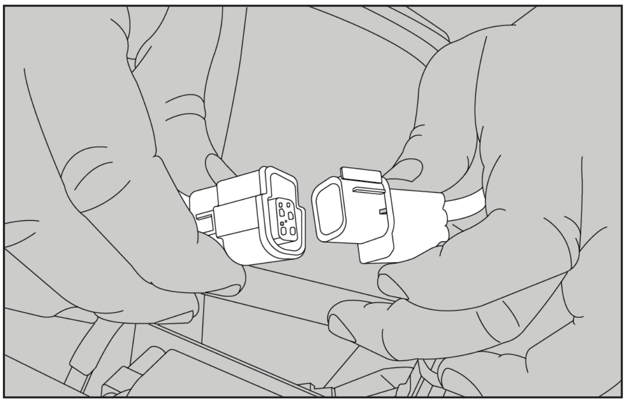
- Disconnect the ECU wiring harness coupler from ECU



- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



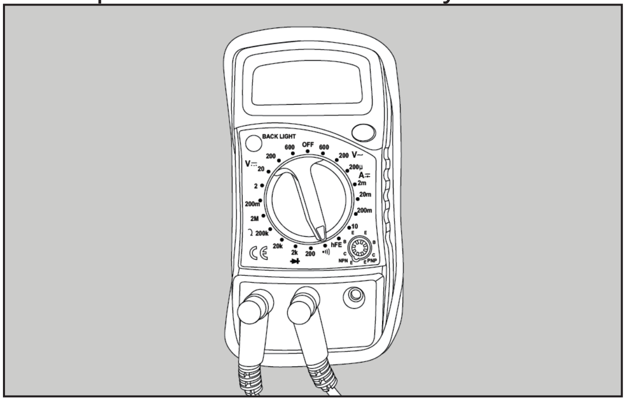
- Disconnect the oxygen sensor coupler.



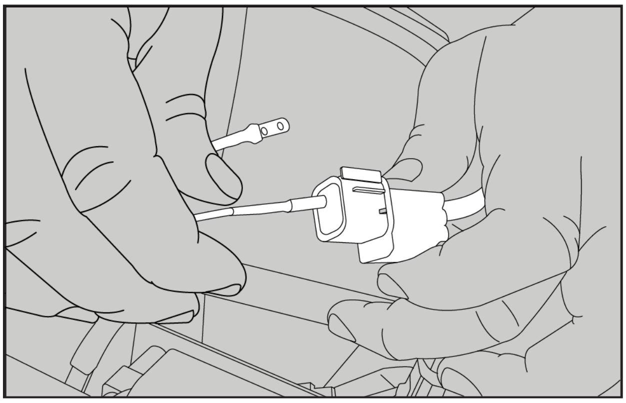
To check Continuity of the Wiring Harness

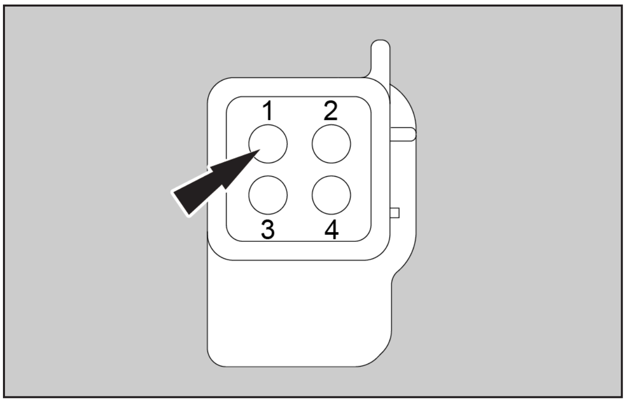
STEP 1:

- Keep the multimeter in continuity mode

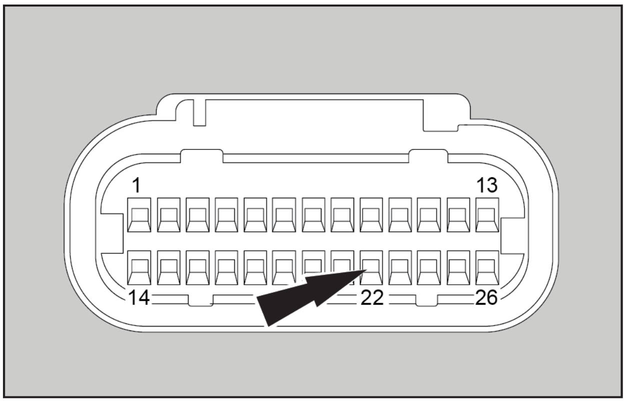


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

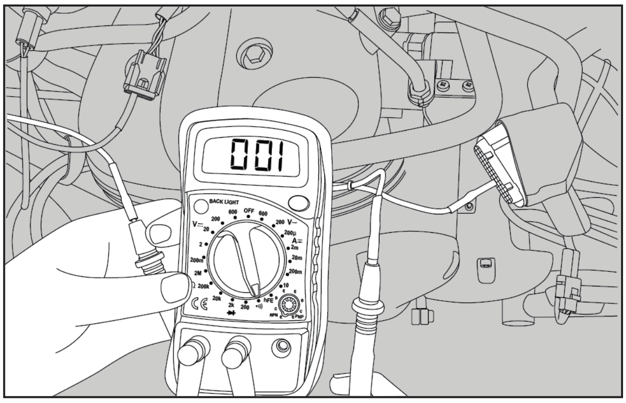




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

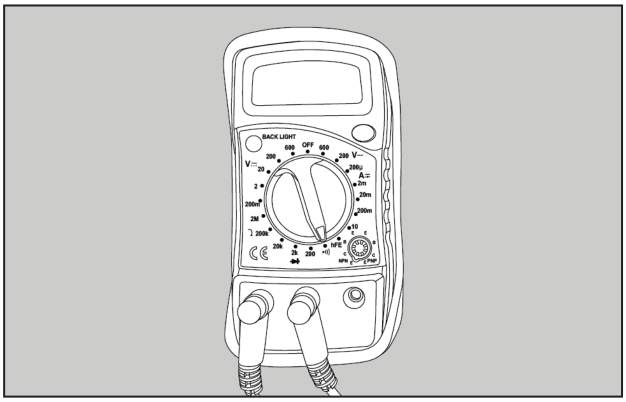


- Check for continuity (Beep Sound from the multimeter)

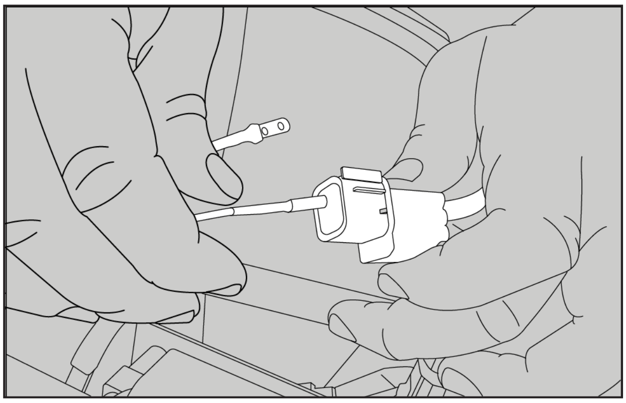


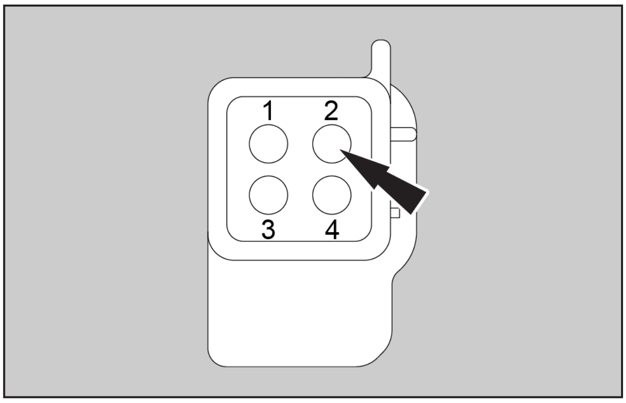
STEP2:

- Keep the multimeter in continuity mode

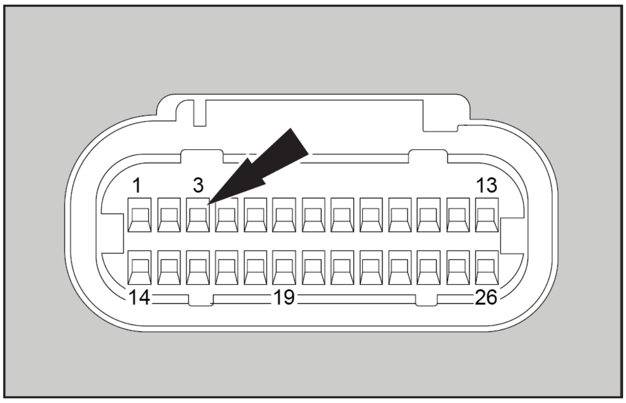


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 3 of the wiring socket.

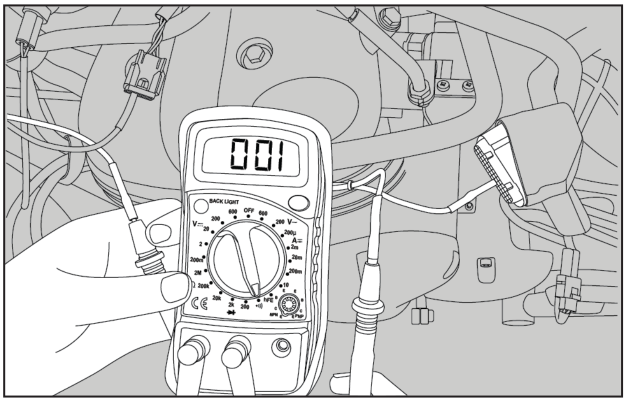




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

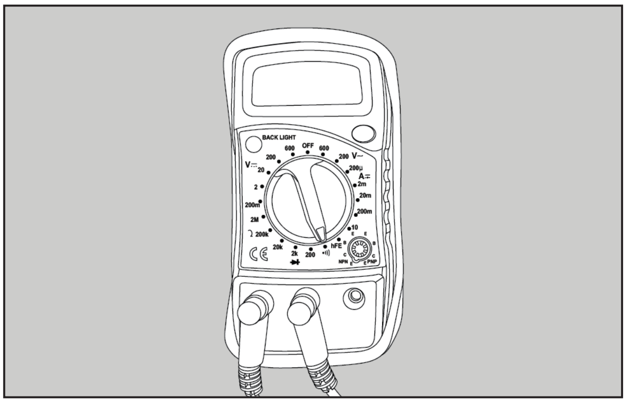


- Check for continuity (Beep Sound) from the multimeter

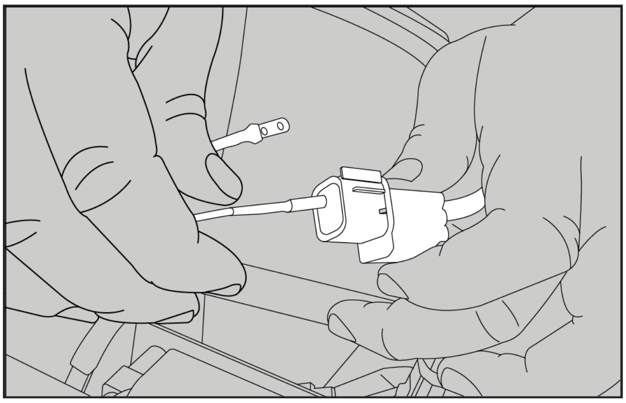


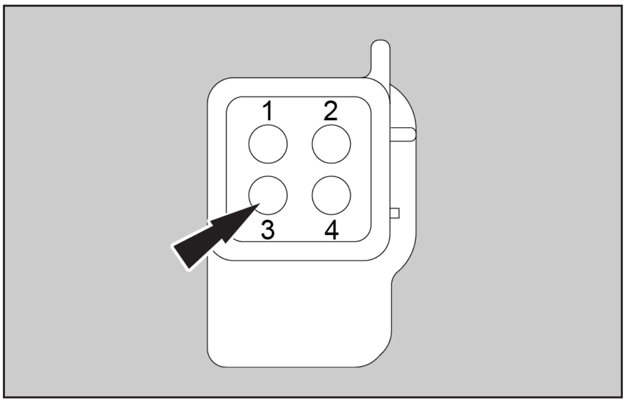
STEP 3:

- Keep the multimeter in continuity mode

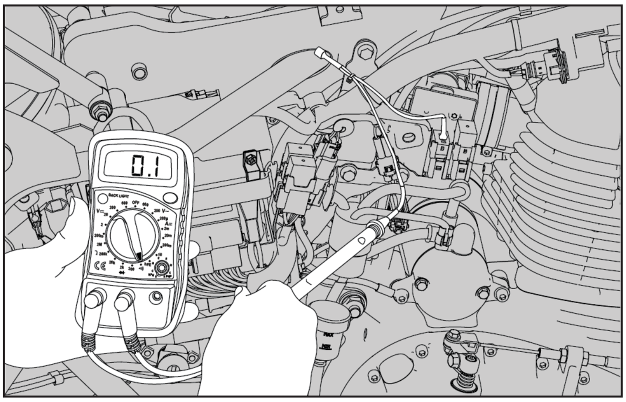


- Connect Test lead wire 60 series (blue color) with the yellow tag to Pin 3 of the wiring socket.

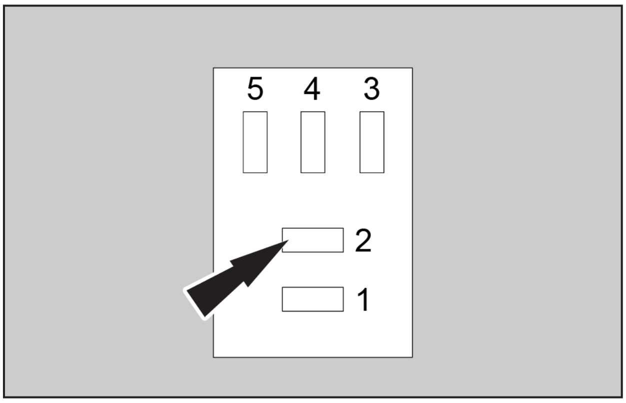




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

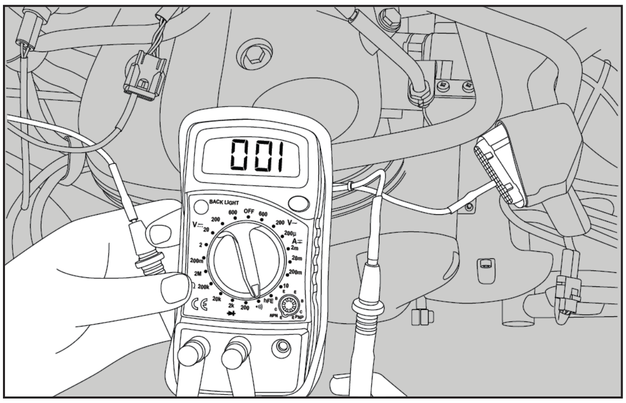


- Check for continuity (Beep Sound) from the multimeter

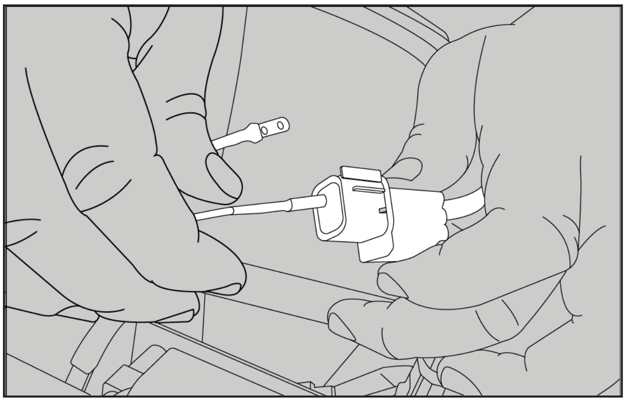


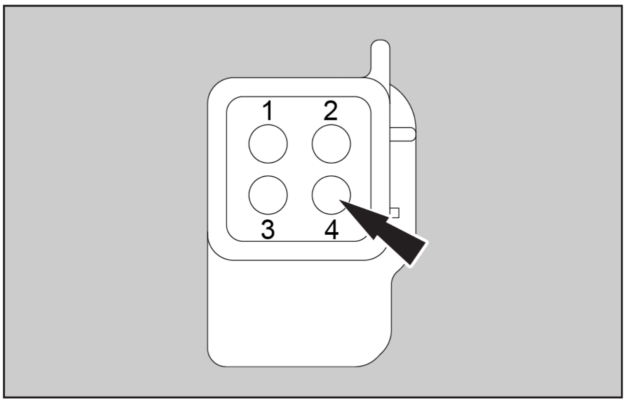
STEP 4:

- Keep the multimeter in continuity mode

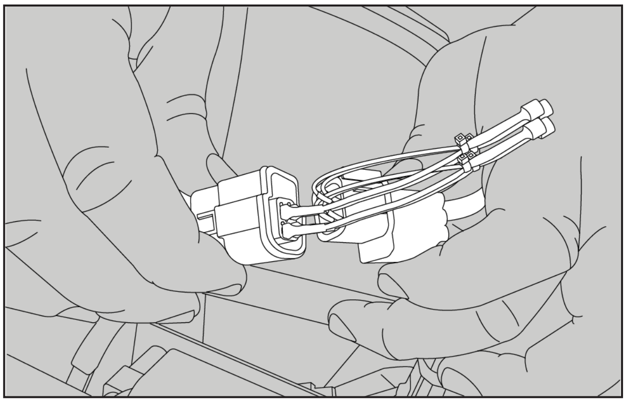


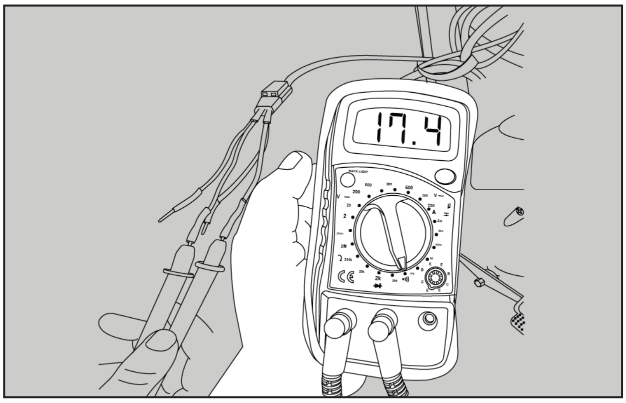
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



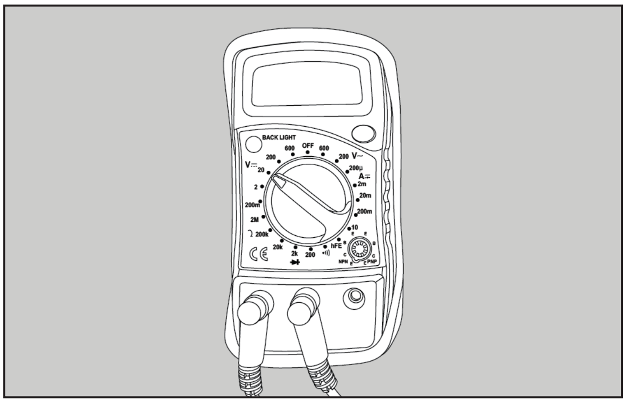


- Disconnect power relay and connect test lead wire into relay socket pin 2.





- Check for continuity (Beep Sound) from the multimeter

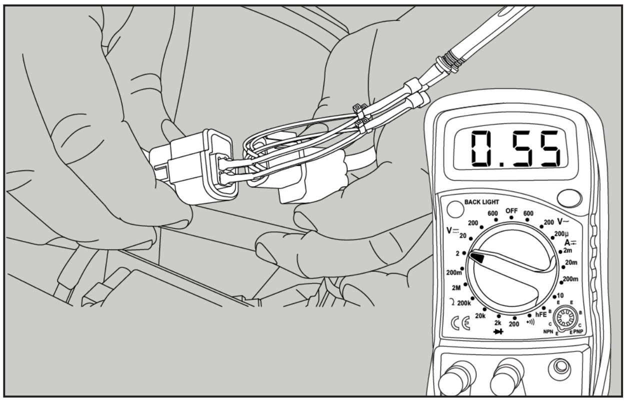


⚠ CAUTION

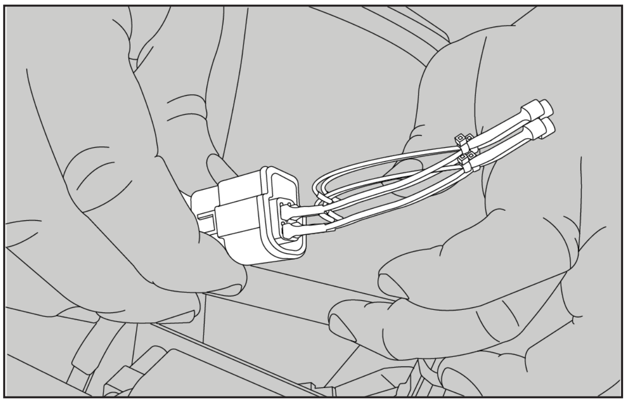
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the resistance of the sensor

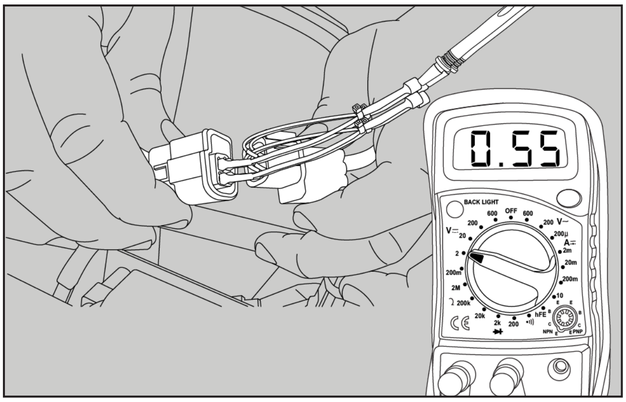
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

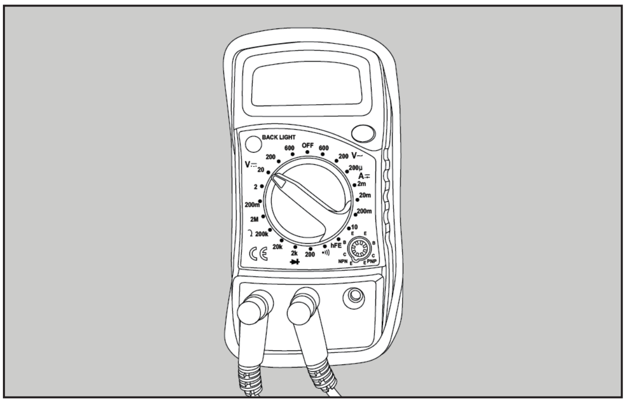


⚠ CAUTION

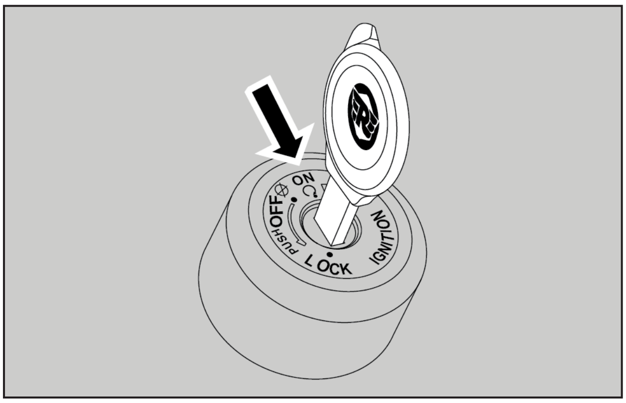
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn “ON” the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)

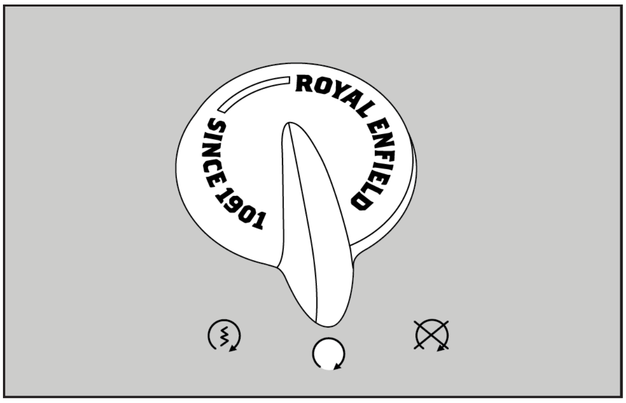


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



d. Decision Point:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13 to17.5 Ohms @ 30 5 °C), you replace with Lambda/Oxygen Sensor
- If the voltage is not meeting the specified limit (0.4 V to 0.55 V)and (0.1V to 0.8 V at idling) and if continuity is available you have to replace the ECU.

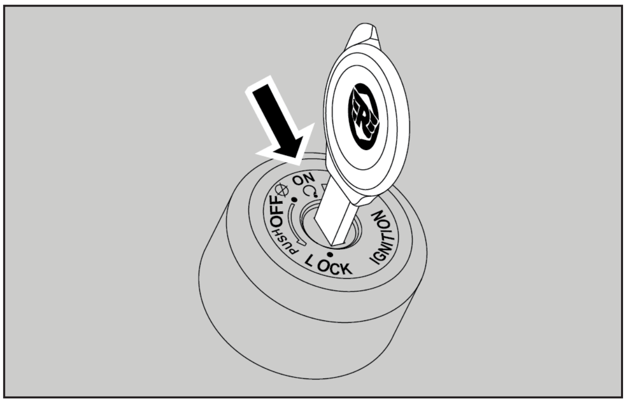
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

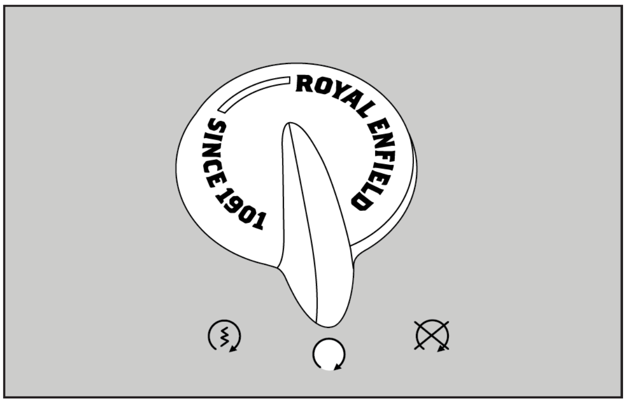
1.3.1. To check the Output voltage

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0131 - LAMBDA SENSOR HEATER DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0131	Lambda Sensor Signal	Oxygen Sensor Circuit Low

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P0131

Type of error : Oxygen Sensor Circuit low

(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

b.Preliminary Checks (Basic Check Points):

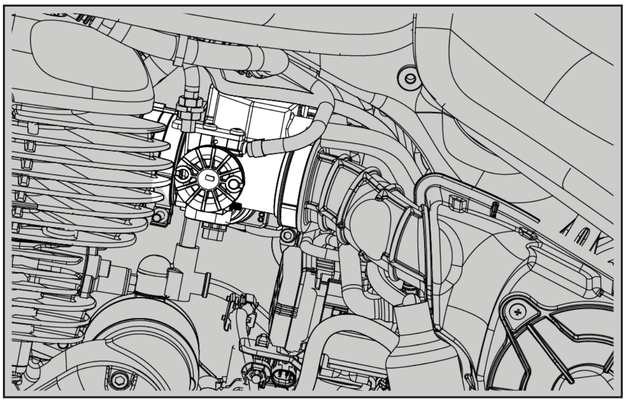
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

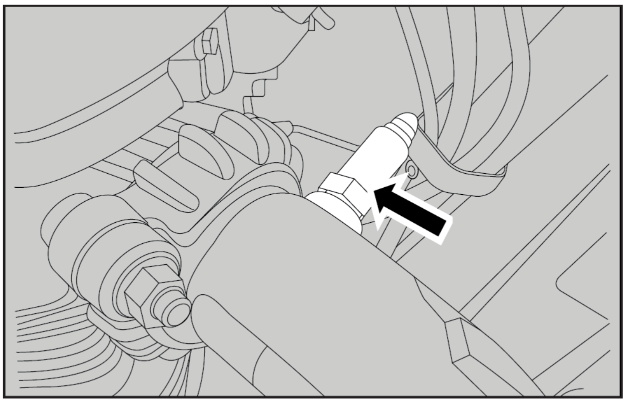
⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

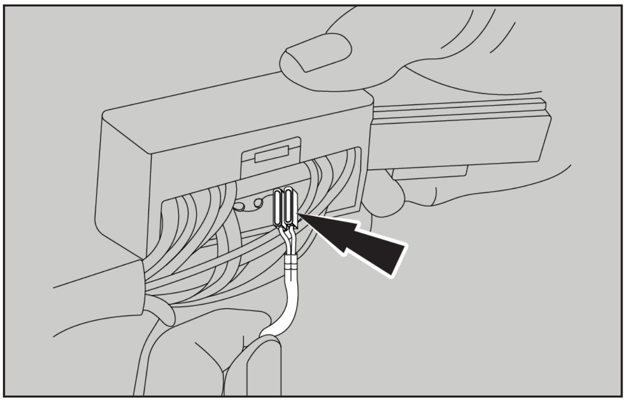
- ECU is located on the throttle body assembly



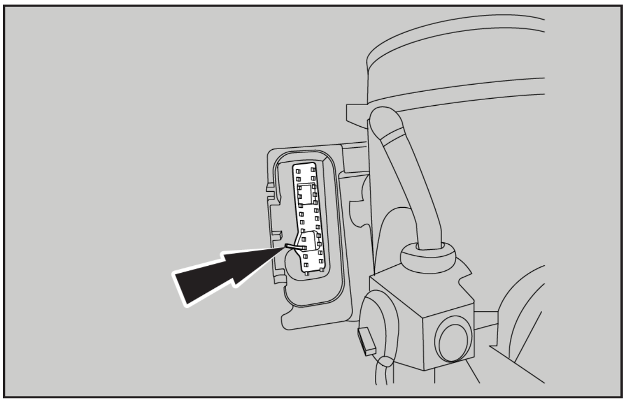
- The lambda sensor is located on the Exhaust pipe



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

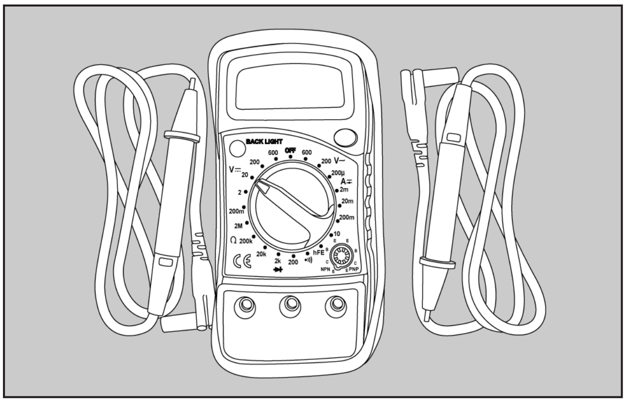
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

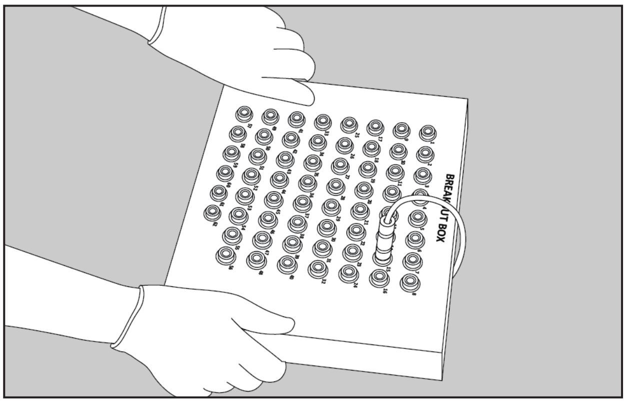
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

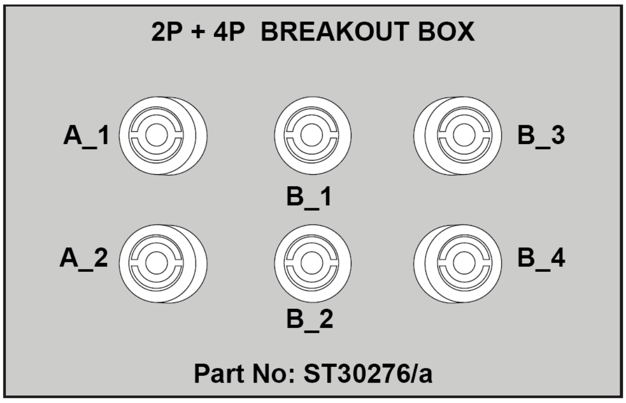
- **Tools Required**
- Multimeter (Universal)



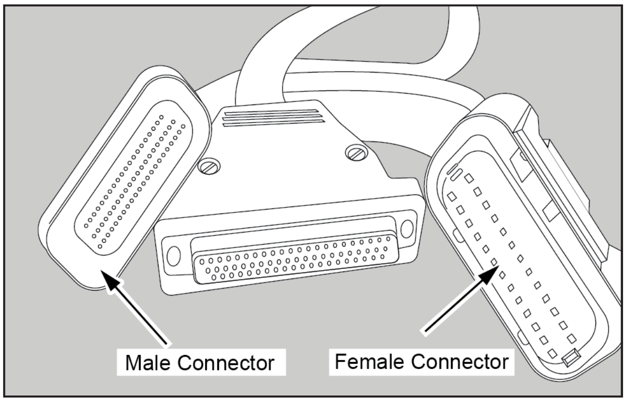
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

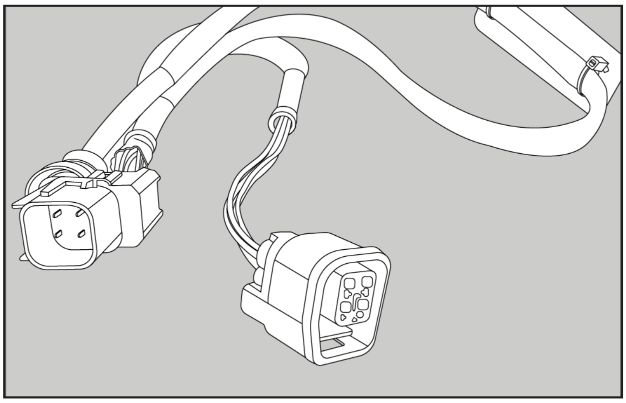
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

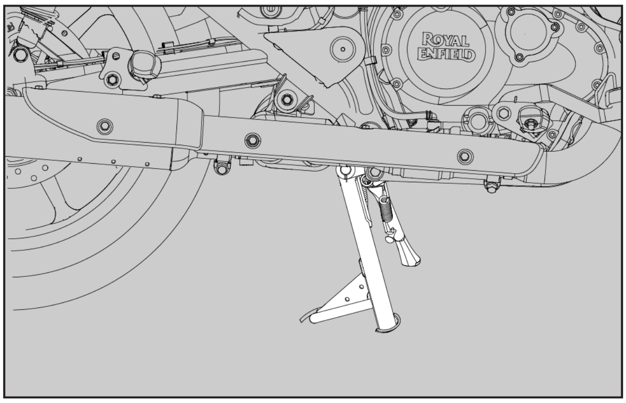

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

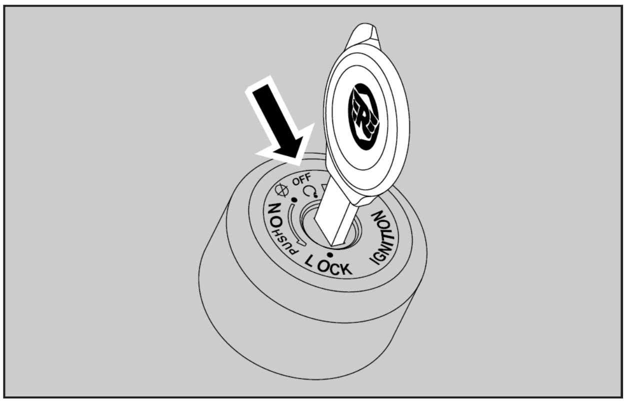


b. Pre-Checks:

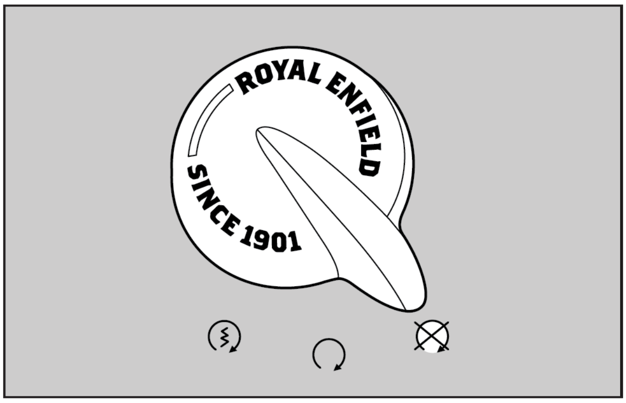
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

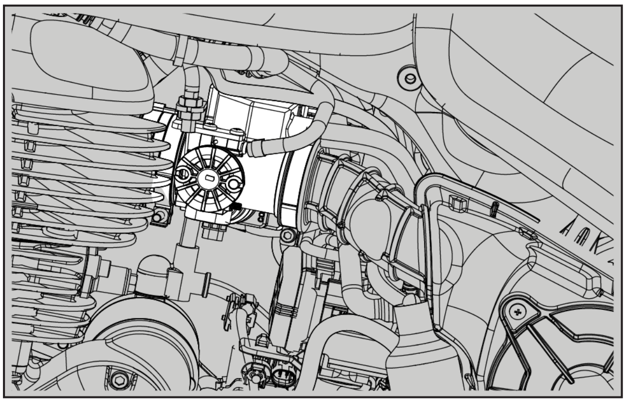
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

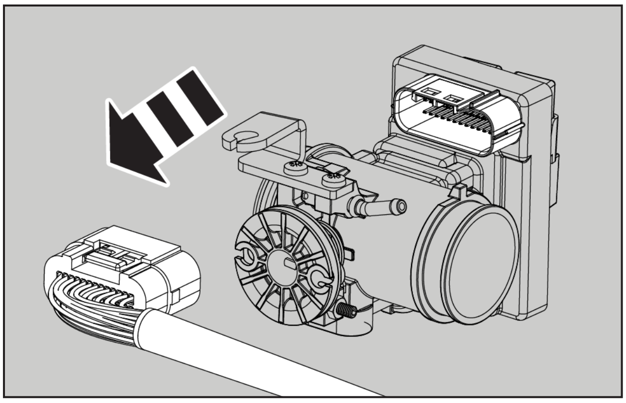
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

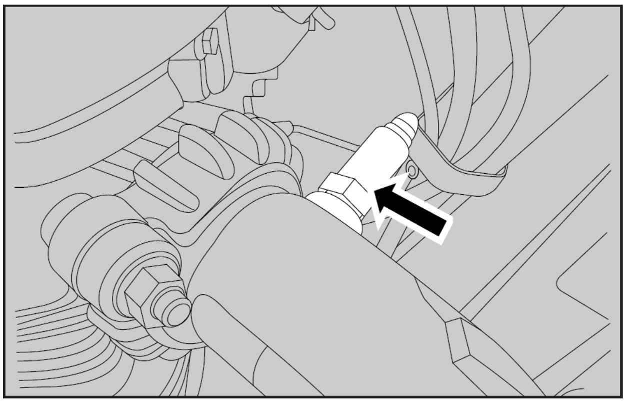
- ECU is located in the throttle body assembly



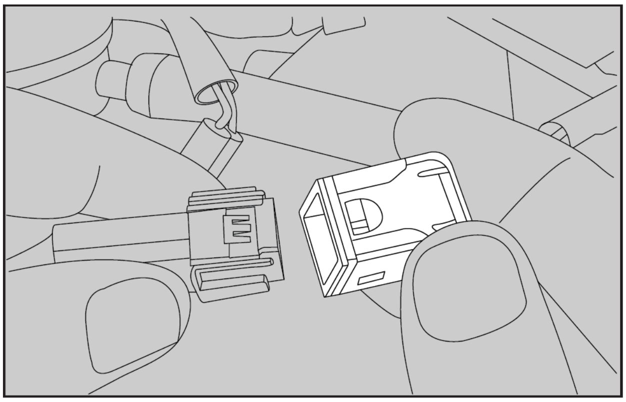
- Disconnect ECU coupler from ECU.



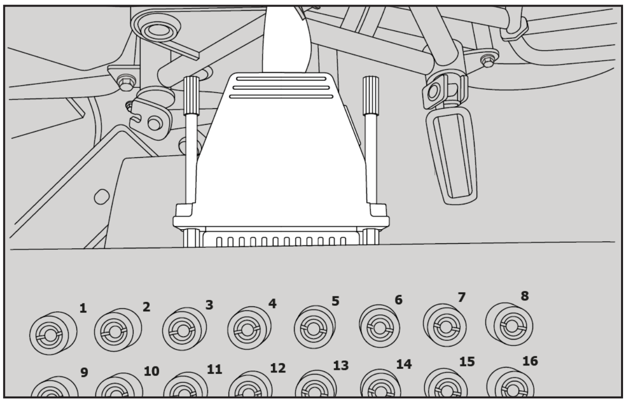
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



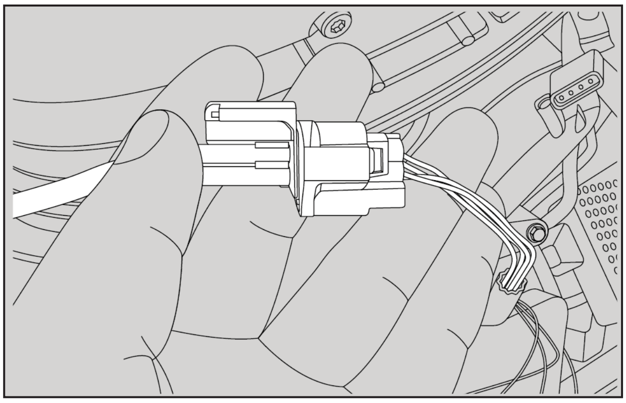
- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.

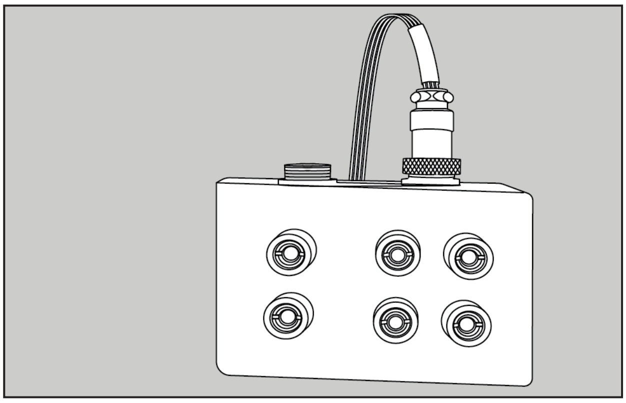


- Connect ECU Breakout box to ECU breakout box harness



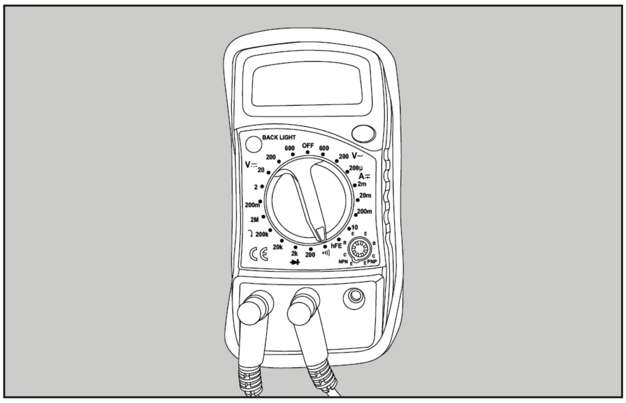
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



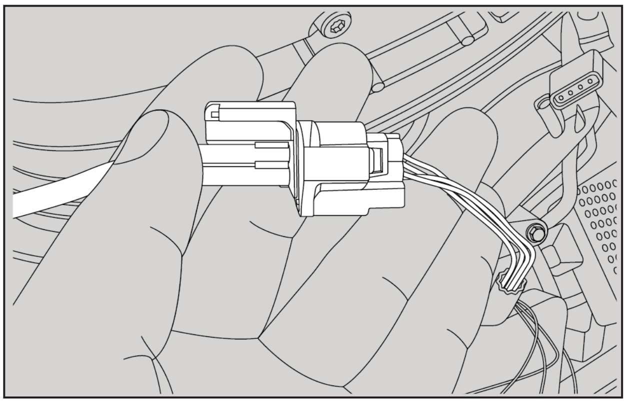


a. To check Continuity of Wiring harness

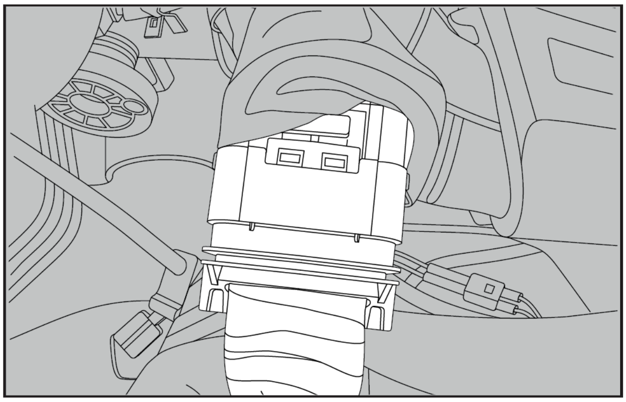
- Keep the multimeter in continuity mode



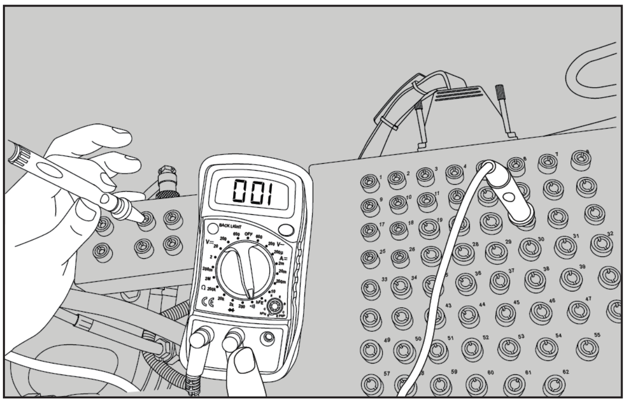
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



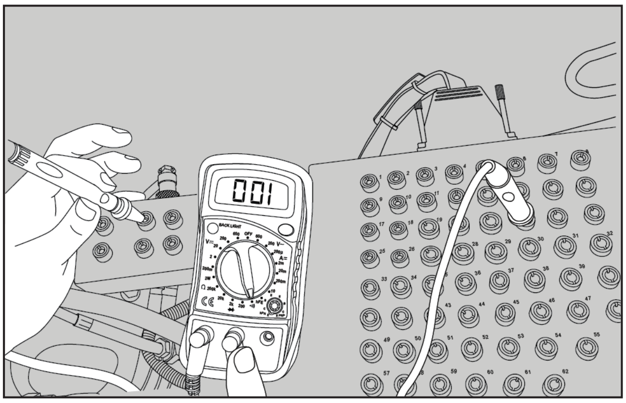
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



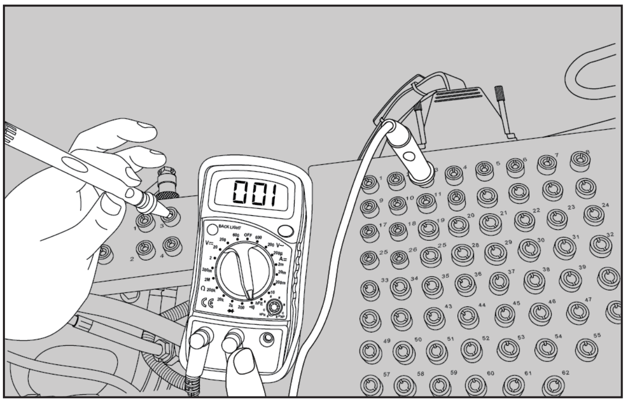
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



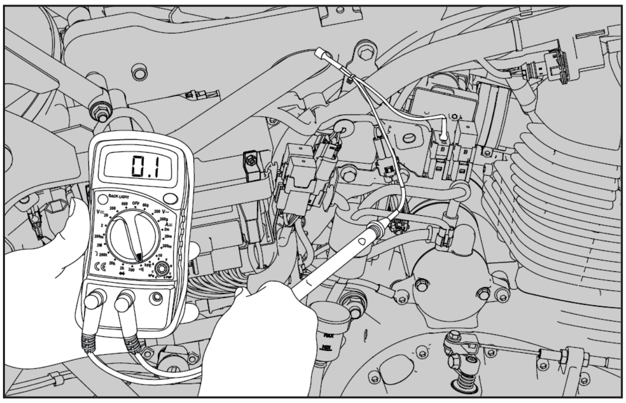
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

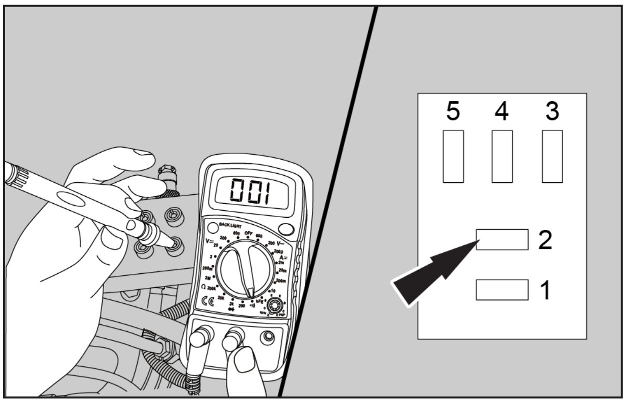


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



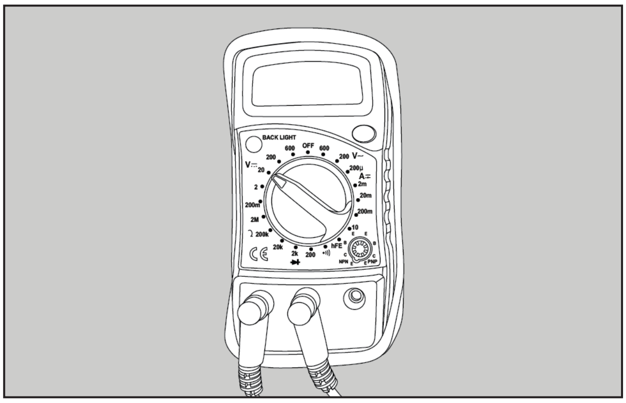
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



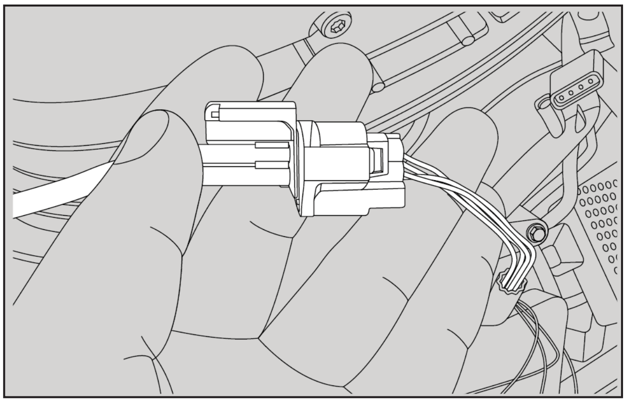


C. To check output voltage

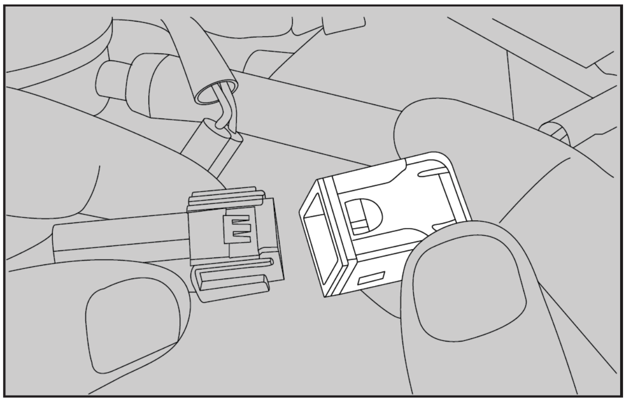
- Keep the multimeter in voltage mode (20V)



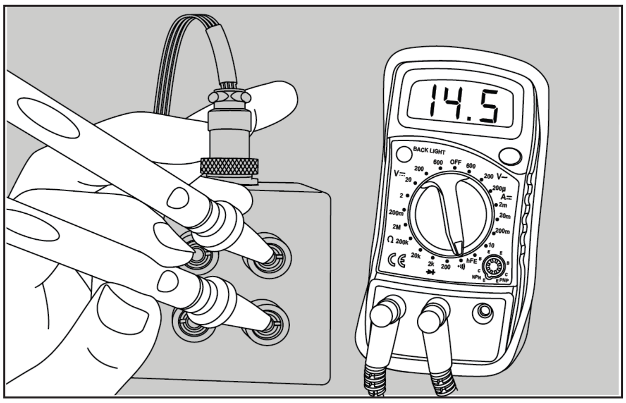
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

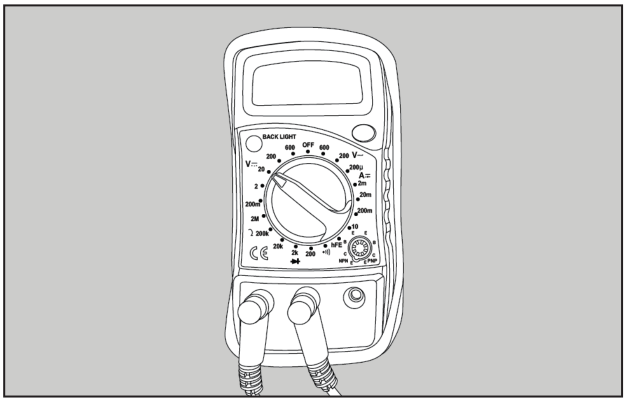


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

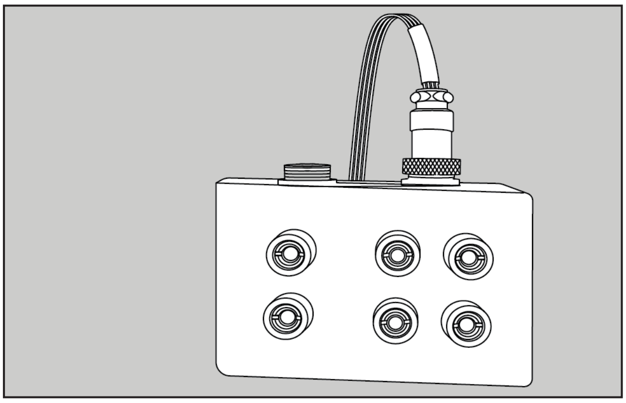


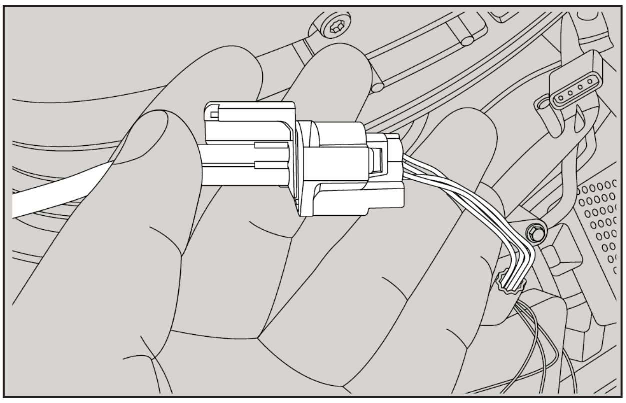
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

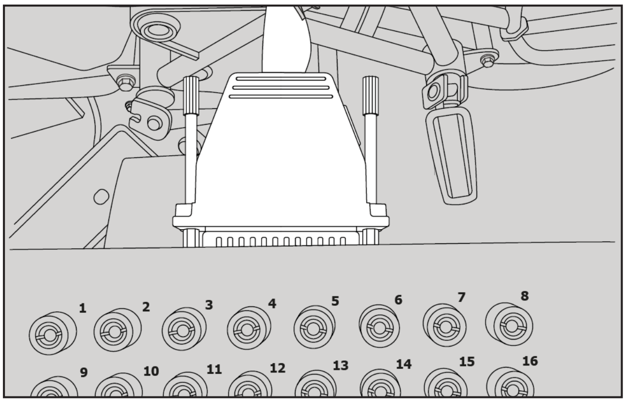


- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler





- Similarly, connect the ECU breakout box to ECU and wiring harness


1
2
3
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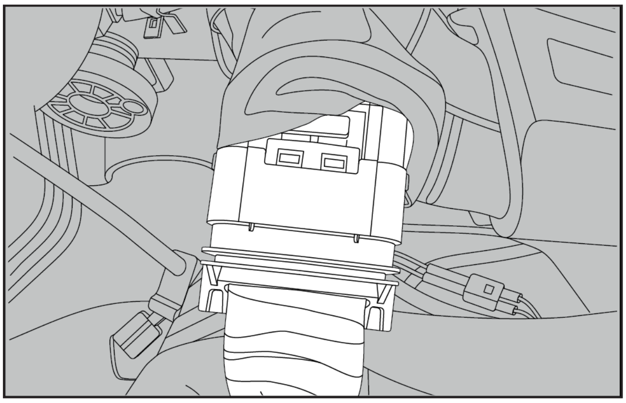
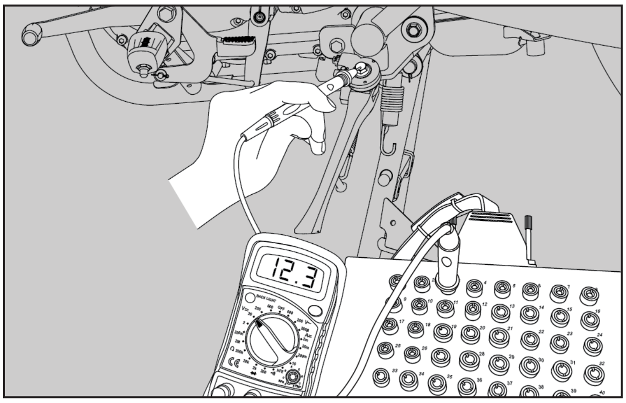
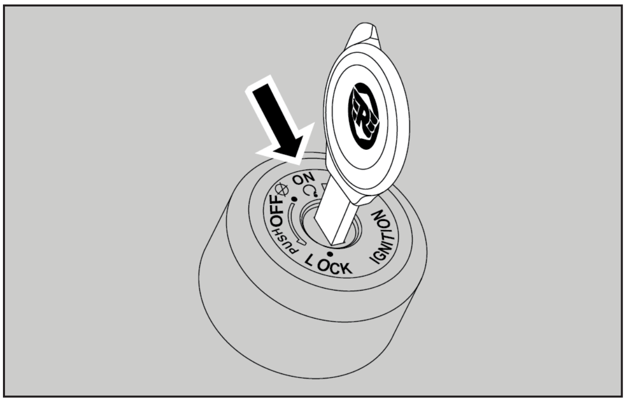
16

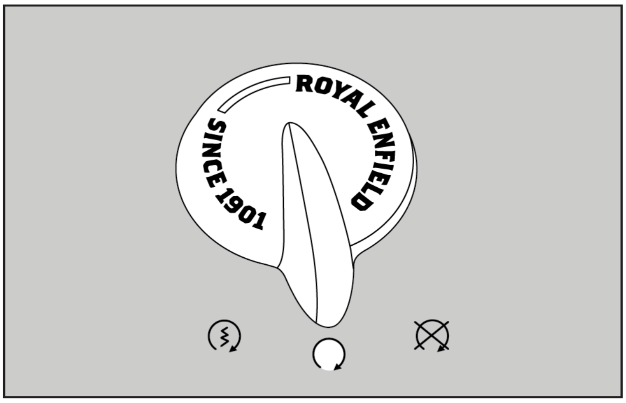


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

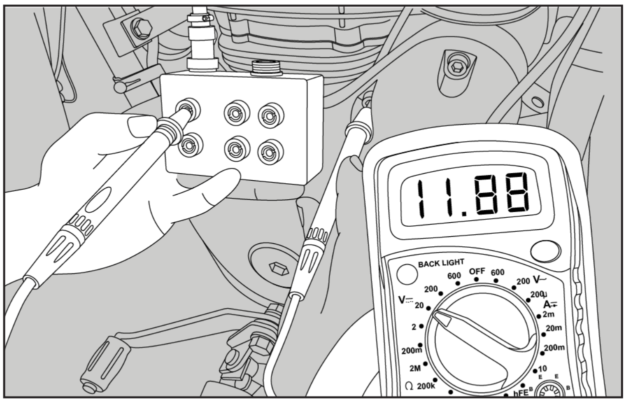


- Turn "ON" the ignition and kill switch


ON
OFF
PUSH
LOCK
IGNITION

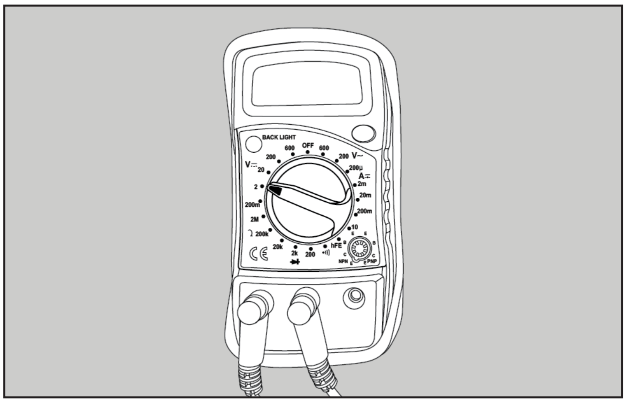

ROYAL ENFIELD
SINCE 1901

- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

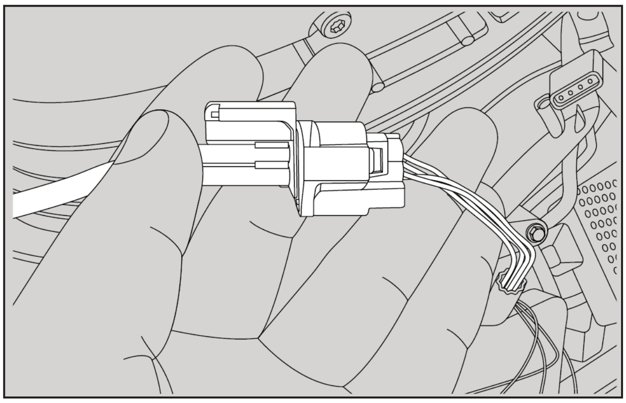


To Check output voltage check

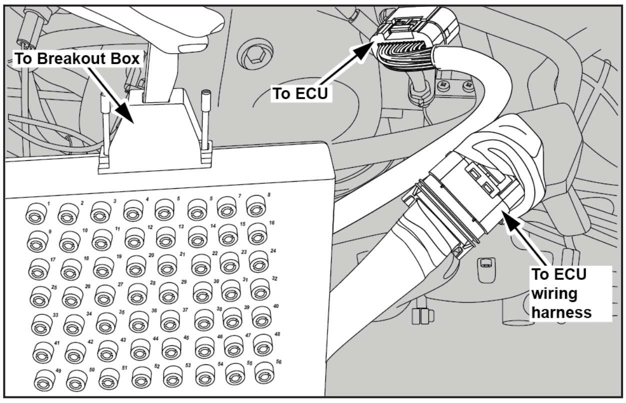
- Keep the multimeter in Voltage mode (2 V).



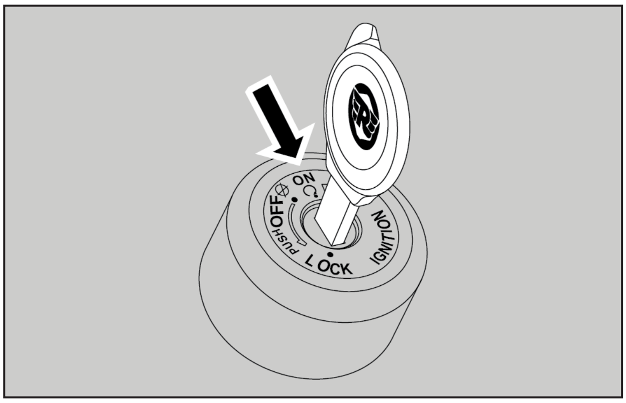
- Connect the female end of the Sensor breakout harness into the sensor coupler

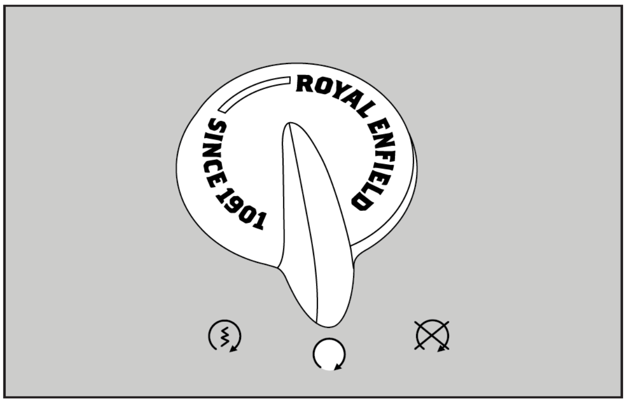


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn "ON" the kill switch and ignition switch

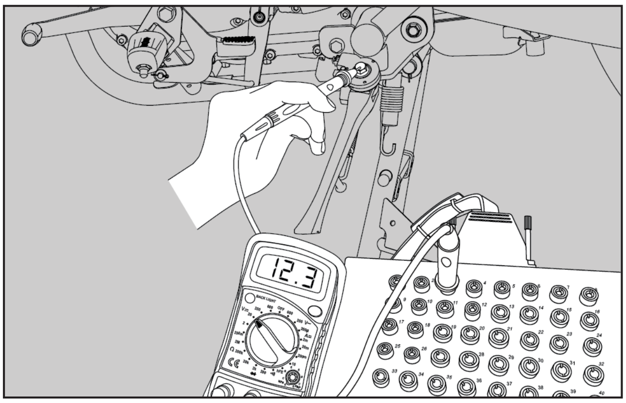

ON
PUSH OFF
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

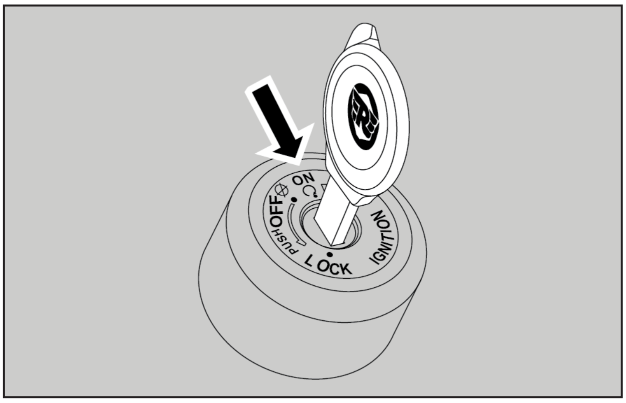
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



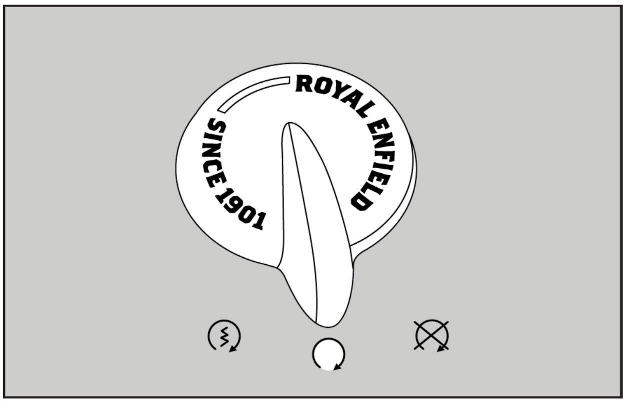
- Switch "OFF" the Engine

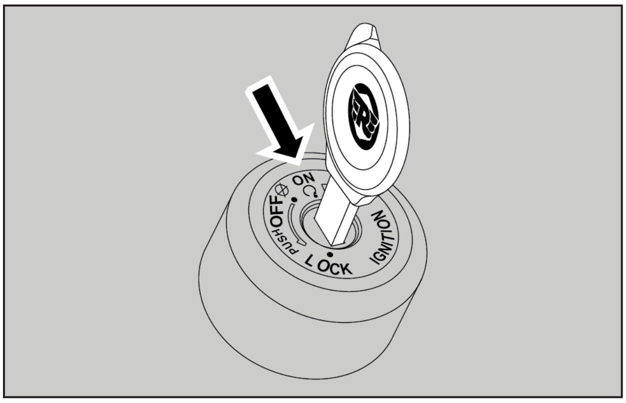
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

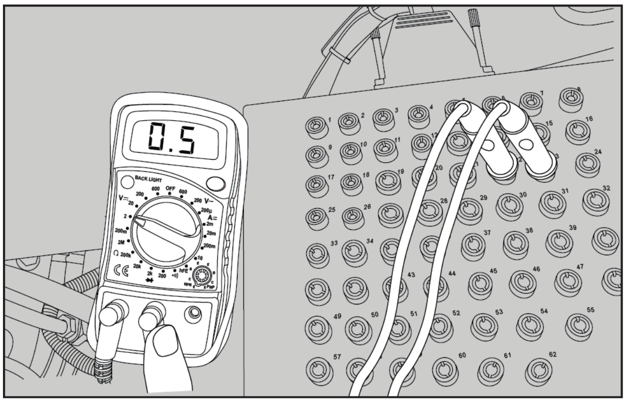

ON
PUSH OFF
LOCK
IGNITION

- Turn "ON" the Ignition switch and kill switch


ROYAL ENFIELD
SINCE 1901


ON
PUSH OFF
LOCK
IGNITION

- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU break outbox



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

d. DECISION POINT:

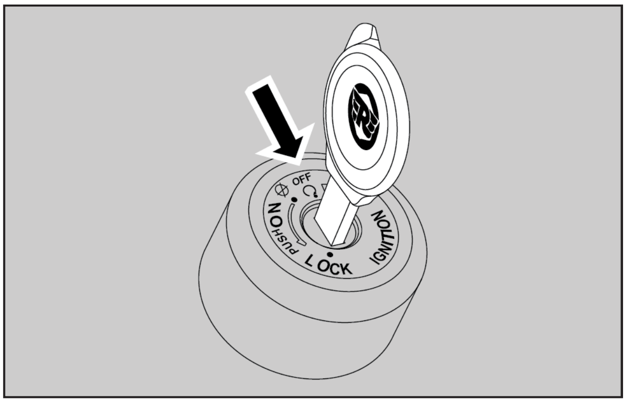
- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the Heater output voltage is 0V (After 10 sec from engine start) then the issue exists in either Sensor heater or ECU
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), you replace with Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) you have to replace the ECU.

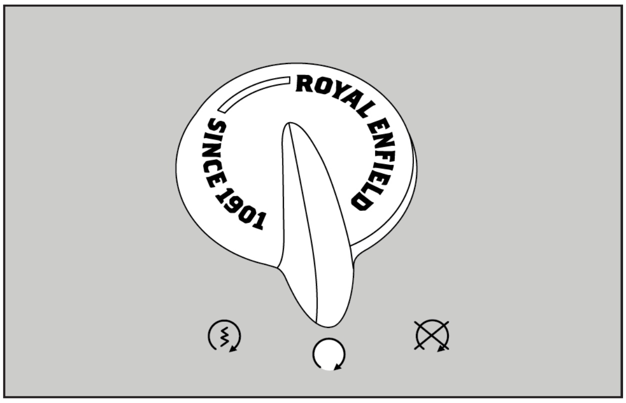
It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

4. DTC Clearing Procedure:

⚠ CAUTION
With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

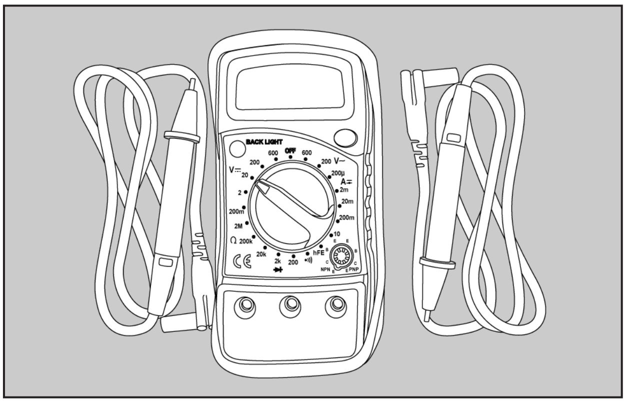
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)



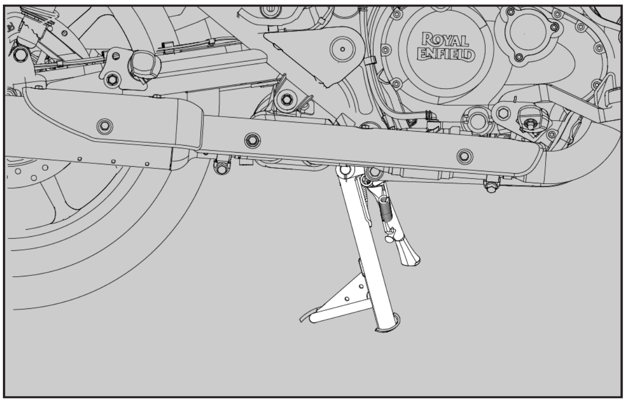
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

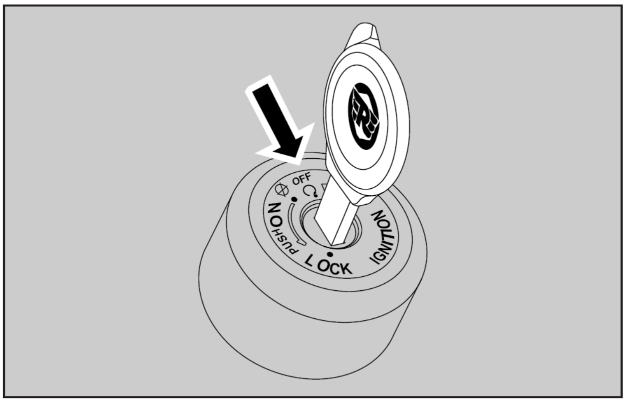
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

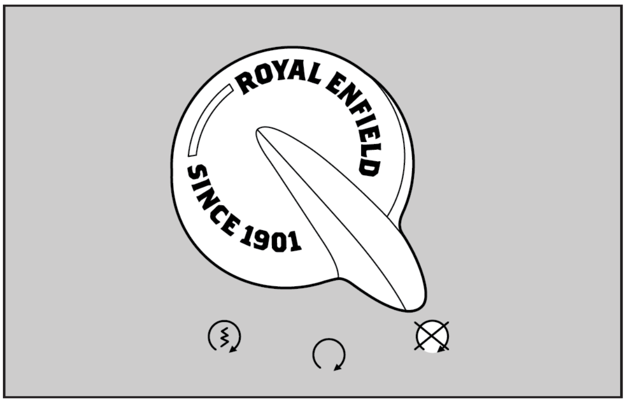
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

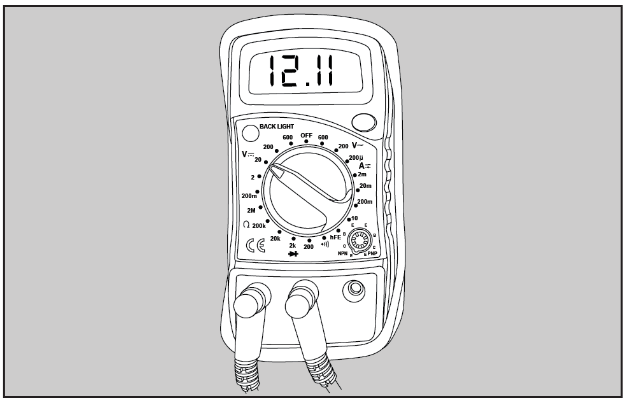


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

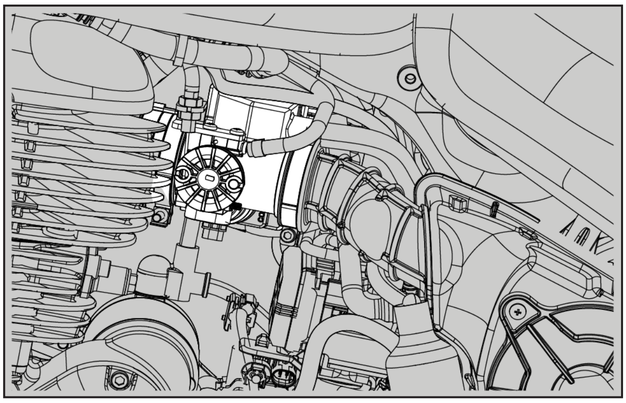
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

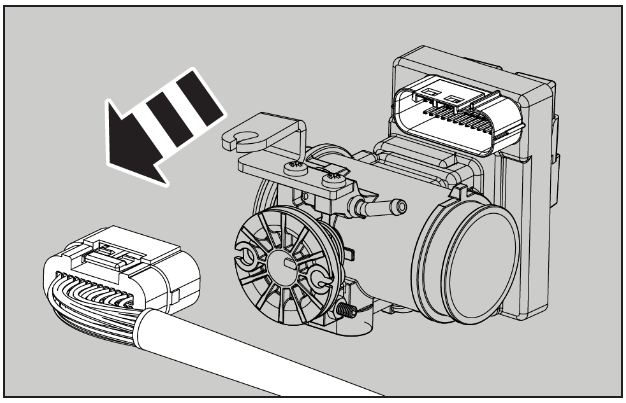
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

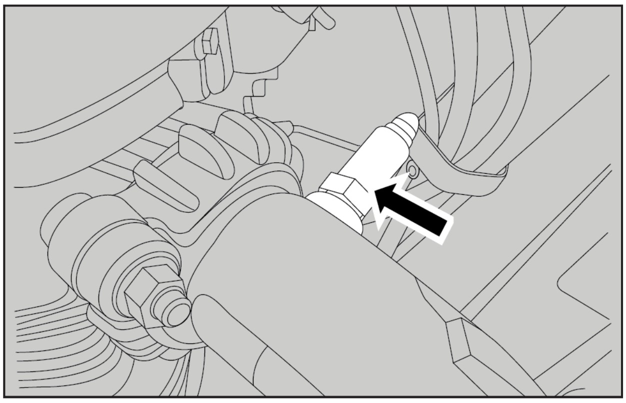
- ECU is located on the Throttle body assembly



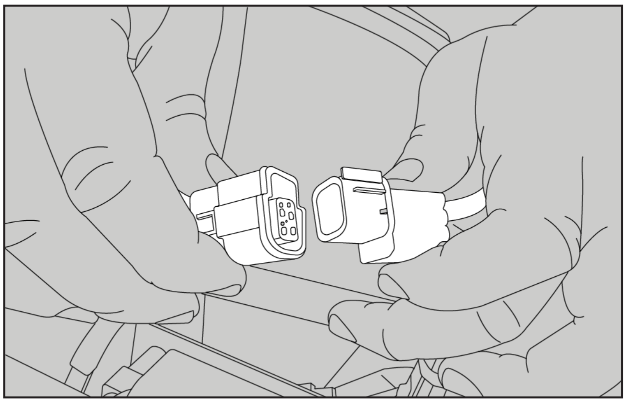
- Disconnect the ECU wiring harness coupler from ECU



- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



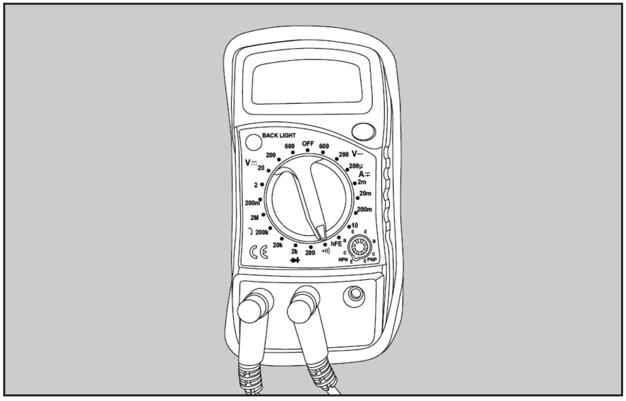
- Disconnect the oxygen sensor coupler.



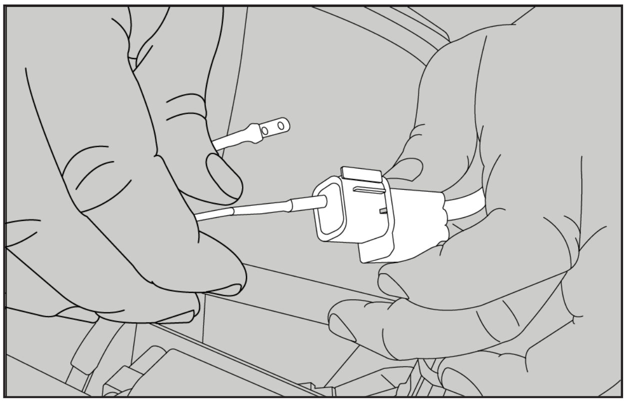
To check Continuity of the Wiring Harness

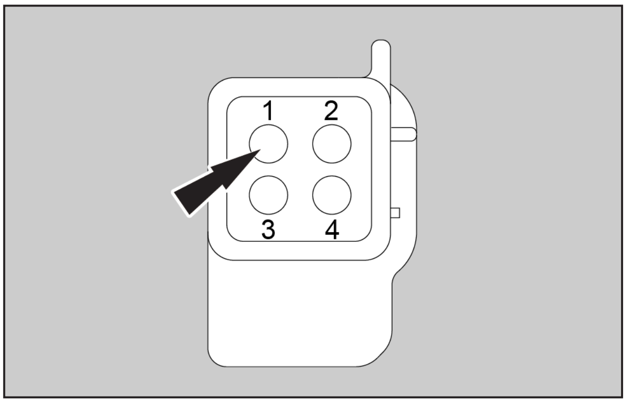
STEP 1:

- Keep the multimeter in continuity mode

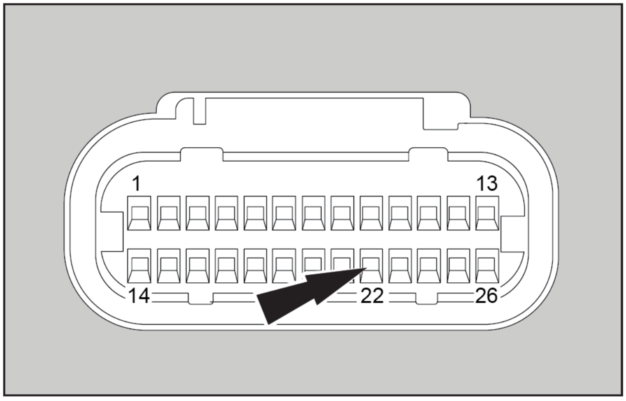


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

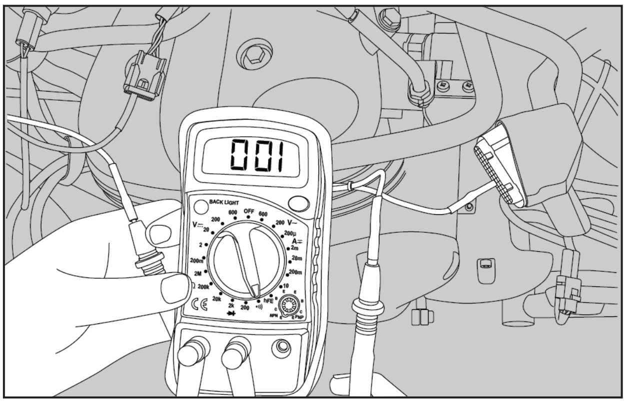




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

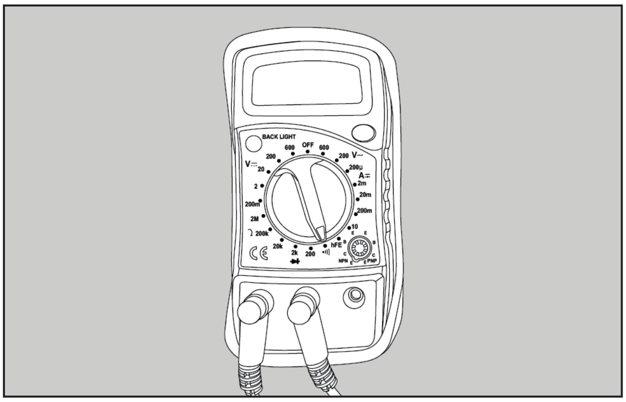


- Check for continuity (Beep Sound from the multimeter)

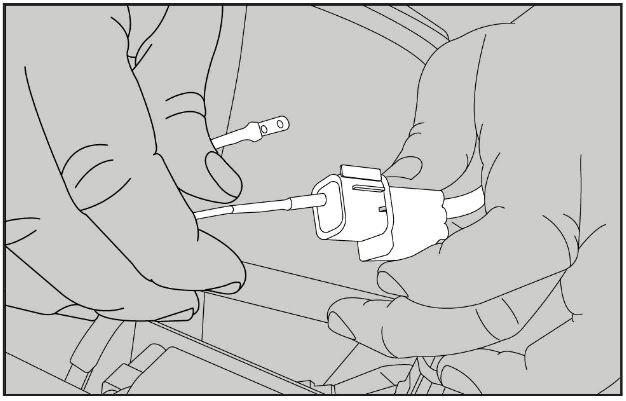


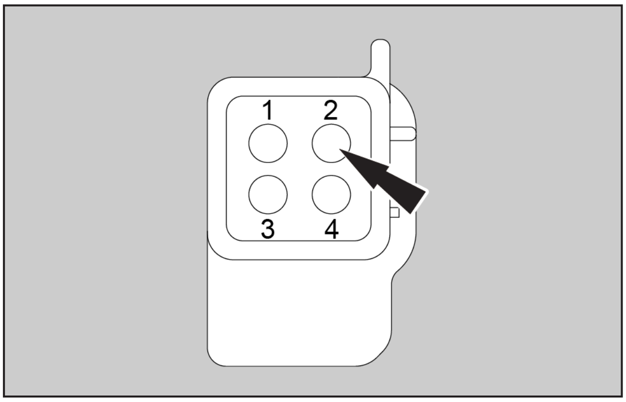
STEP2:

- Keep the multimeter in continuity mode

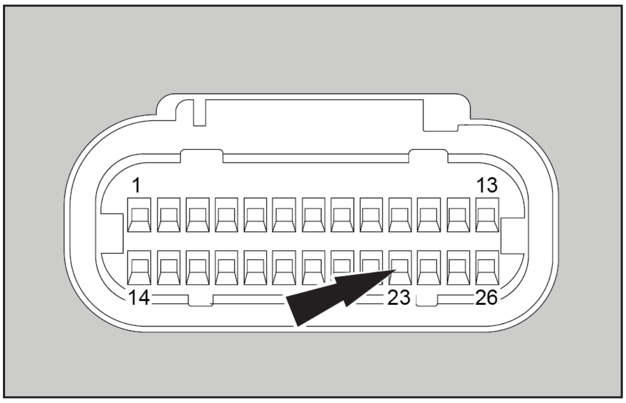


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 3 of the wiring socket.

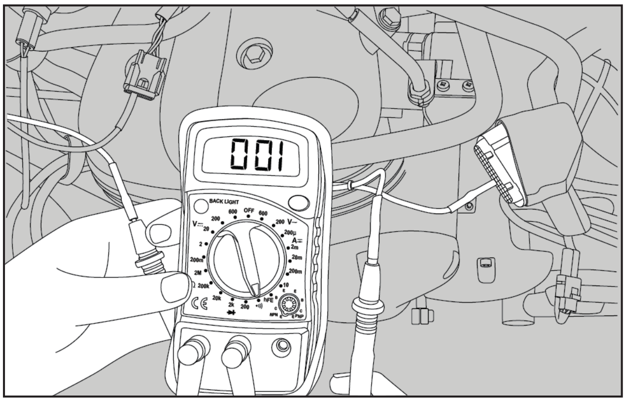




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

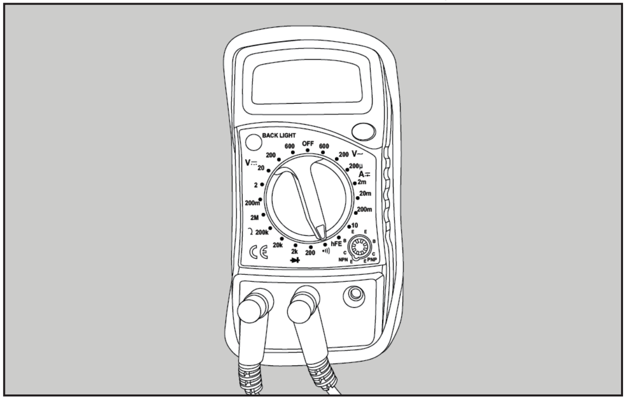


- Check for continuity (Beep Sound) from the multimeter

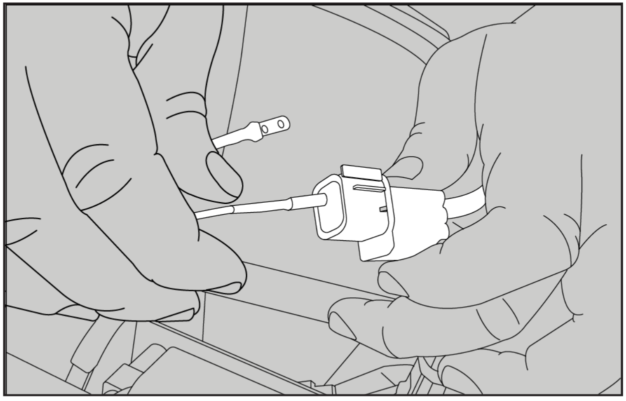


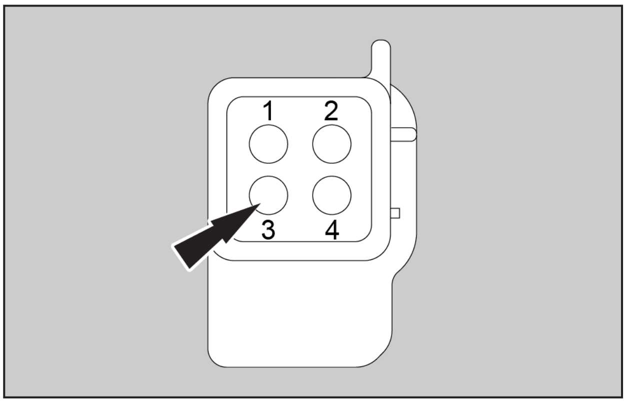
STEP 3:

- Keep the multimeter in continuity mode

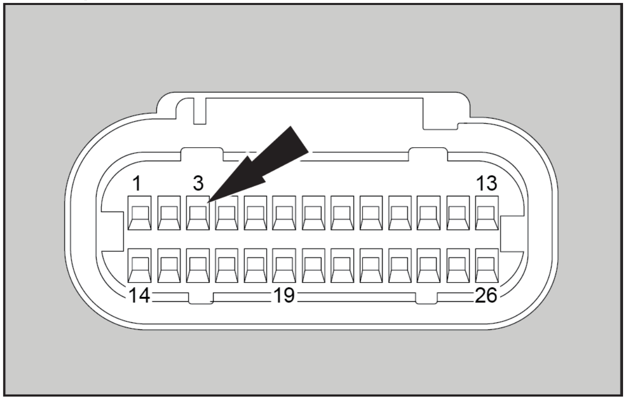


- Connect Test lead wire 60 series (blue color) with the yelllow tag to Pin 3 of the wiring socket.

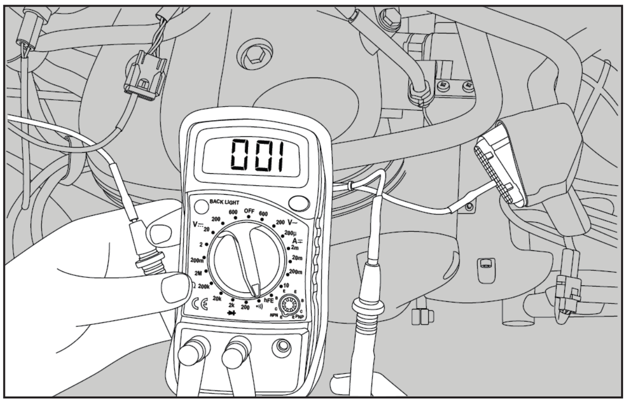




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

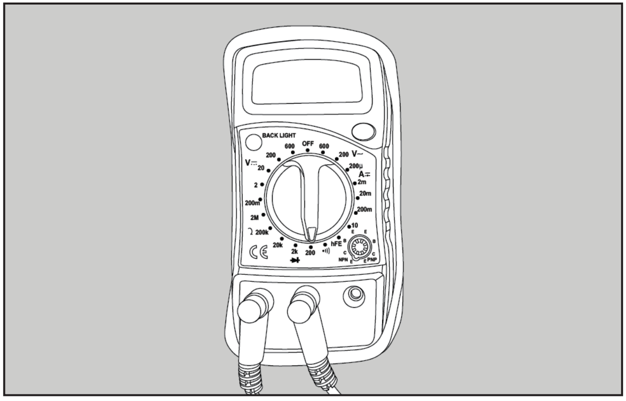


- Check for continuity (Beep Sound) from the multimeter

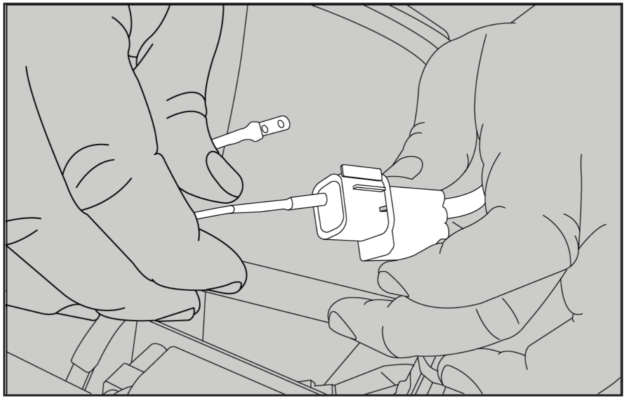


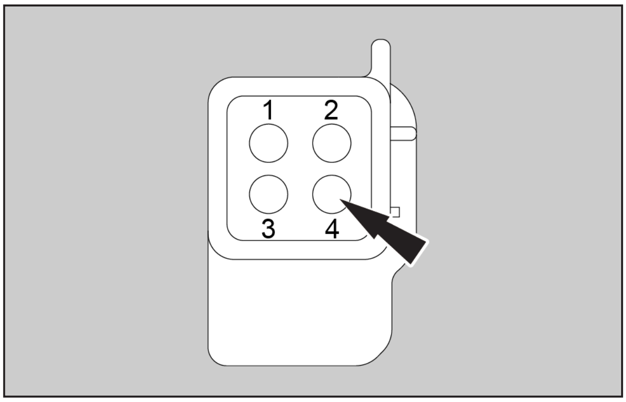
STEP 4:

- Keep the multimeter in continuity mode

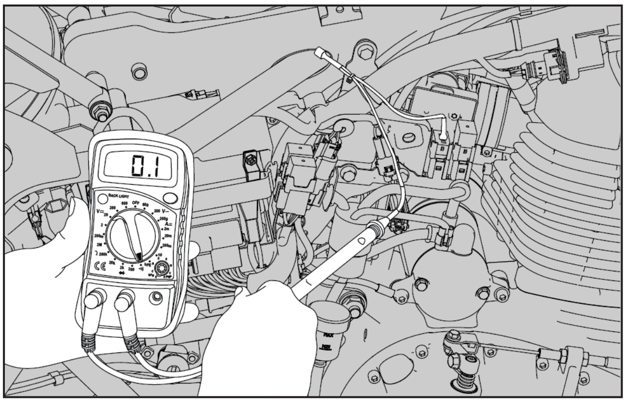


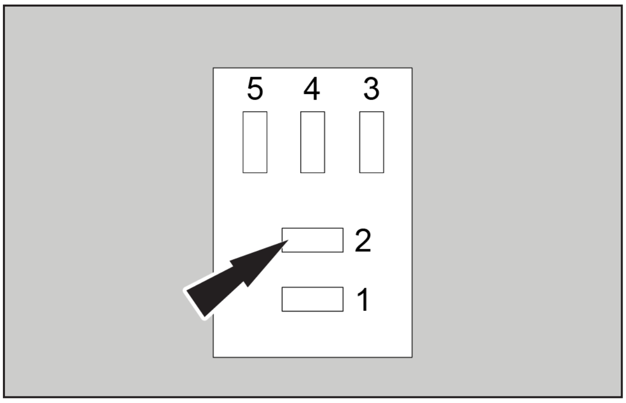
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



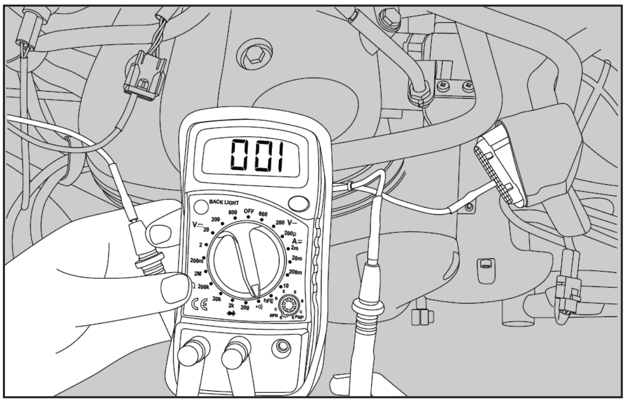


- Disconnect power relay and connect test lead wire into relay socket pin 2.





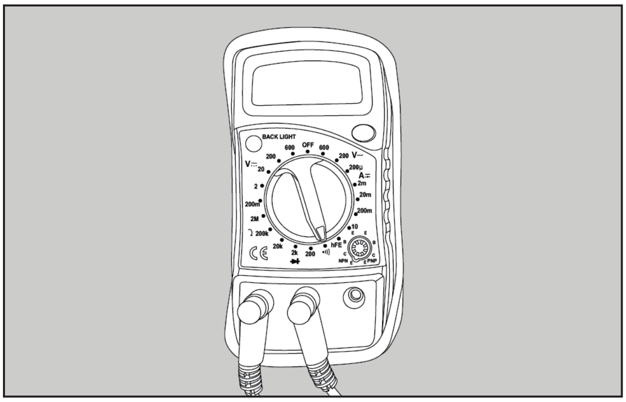
- Check for continuity (Beep Sound) from the multimeter



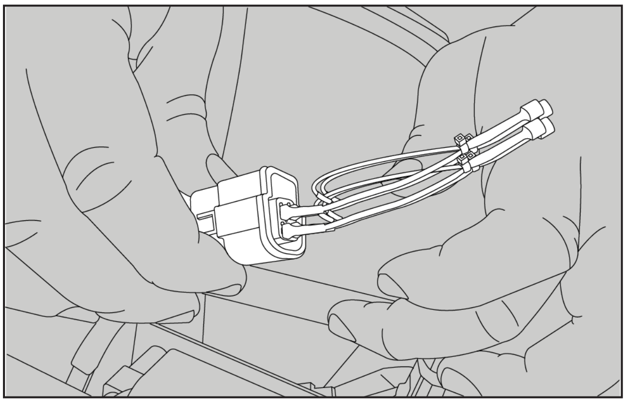
> ⚠ **CAUTION**
>
> **Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.**

To check the resistance of the sensor

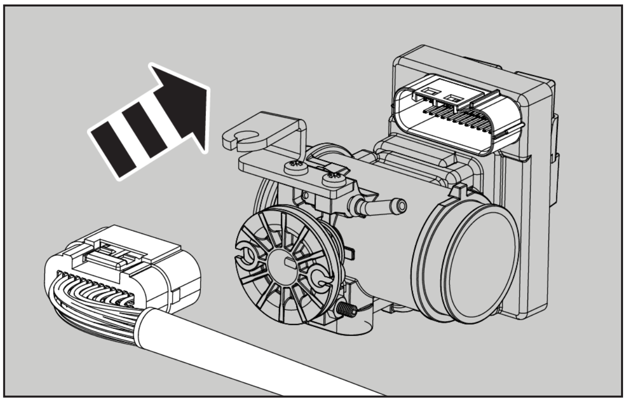
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

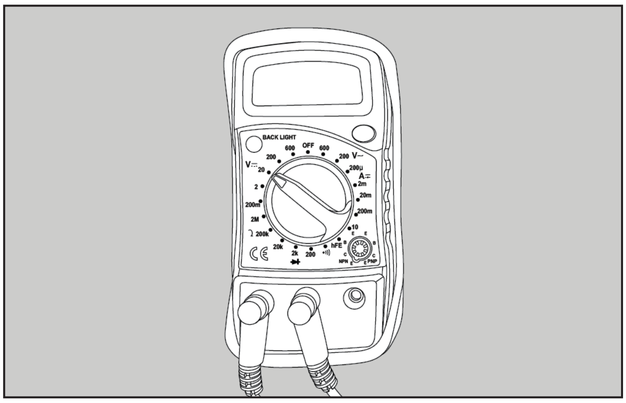


⚠ CAUTION

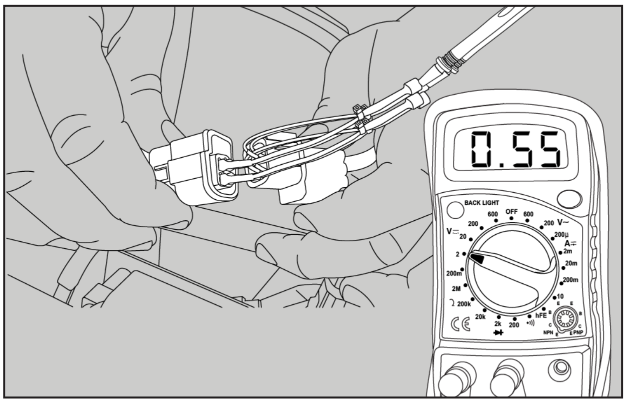
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn "ON" the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)

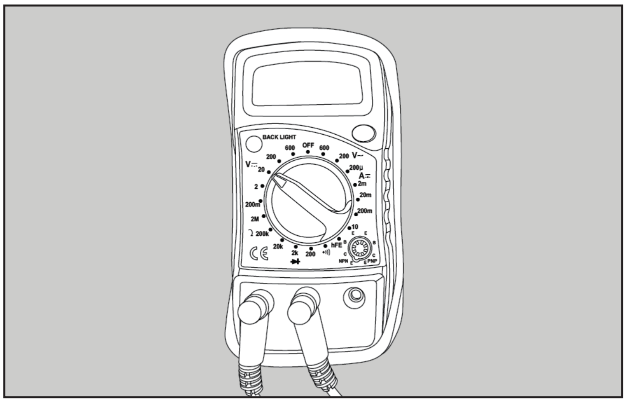


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



d. Decision Point:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13 to17.5 Ohms @ 30 5 °C), you replace with Lambda/Oxygen Sensor
- If the voltage is not meeting the specified limit (0.4 V to 0.55 V)and (0.1V to 0.8 V at idling) and if continuity is available you have to replace the ECU.

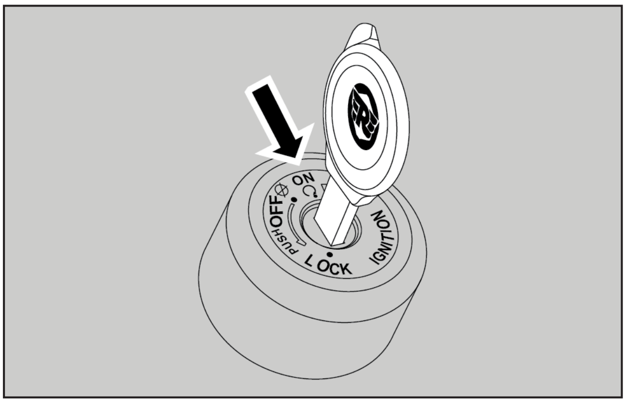
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

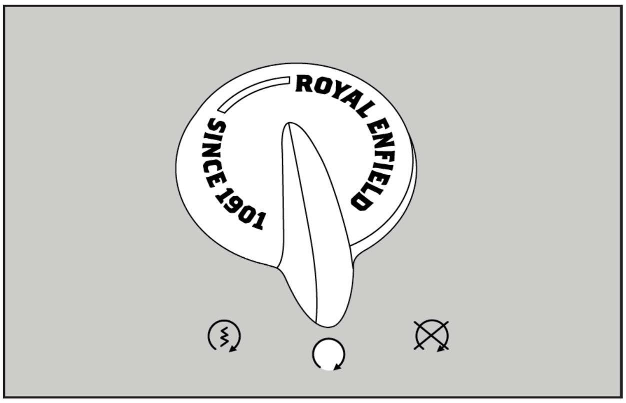
1.3.1. To check the Output voltage

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0132 - LAMBDA SENSOR HEATER

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0132	Lambda Sensor Signal	Oxygen Sensor Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P0132

Type of error : Oxygen Sensor Circuit High

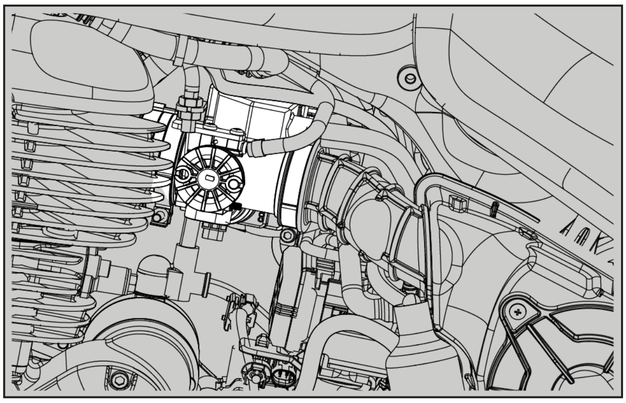
(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

b.Preliminary Checks (Basic Check Points):

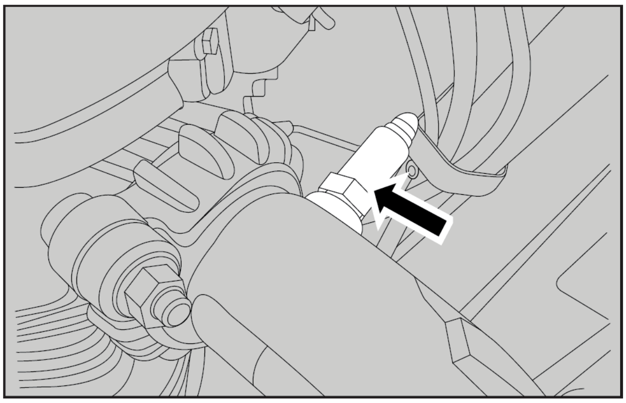
⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

⚠ CAUTION
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

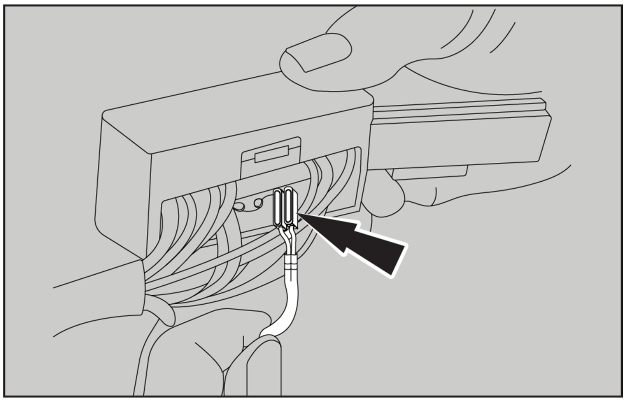
- ECU is located on the throttle body assembly



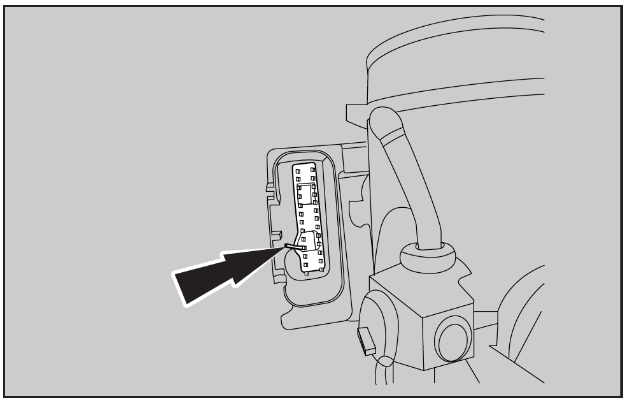
- The lambda sensor is located on the Exhaust pipe



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

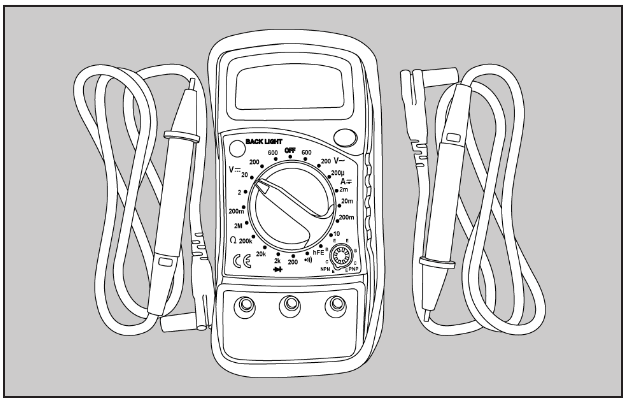
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

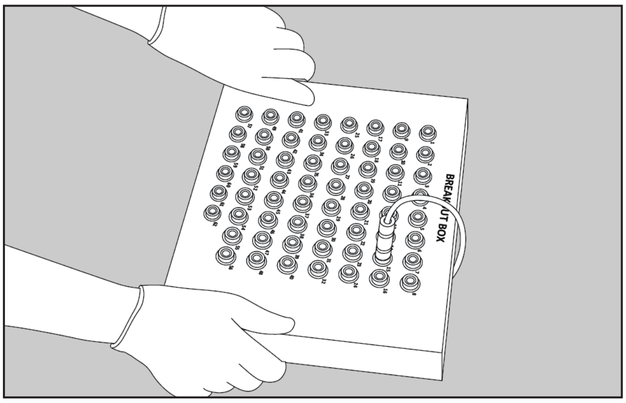
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

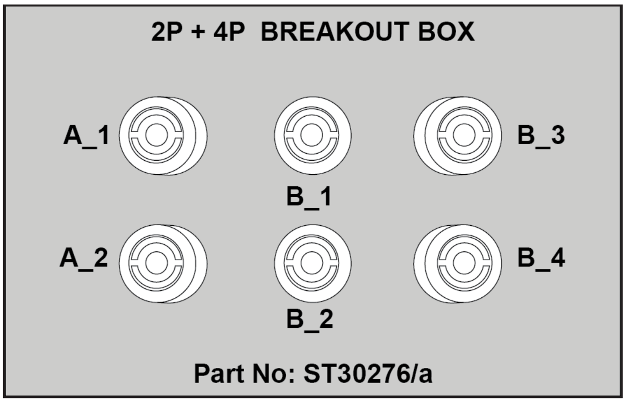
- **Tools Required**
- Multimeter (Universal)



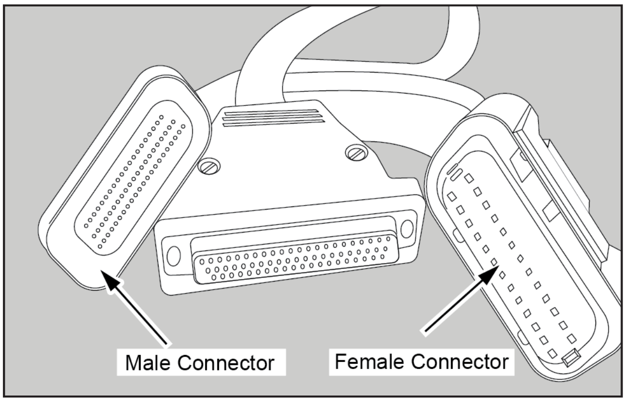
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

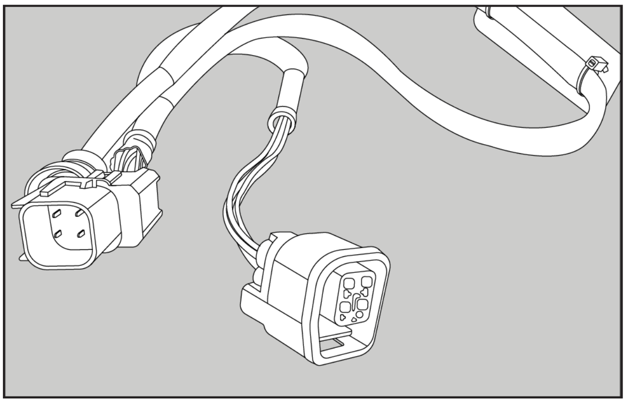
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

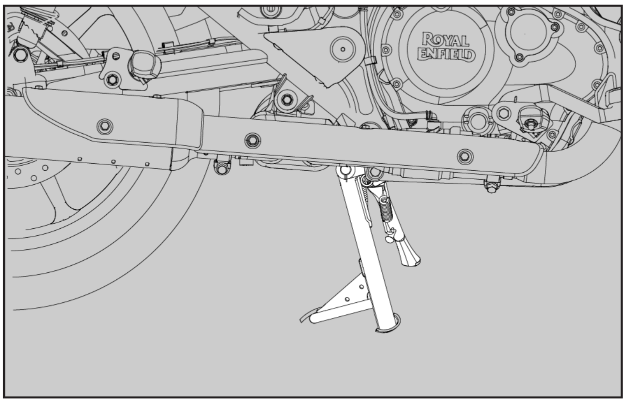

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

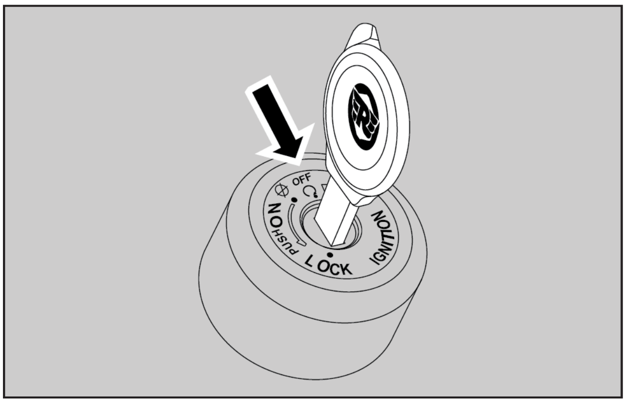


b. Pre-Checks:

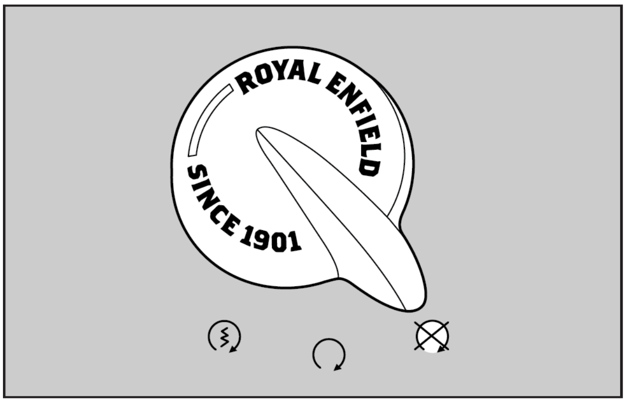
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

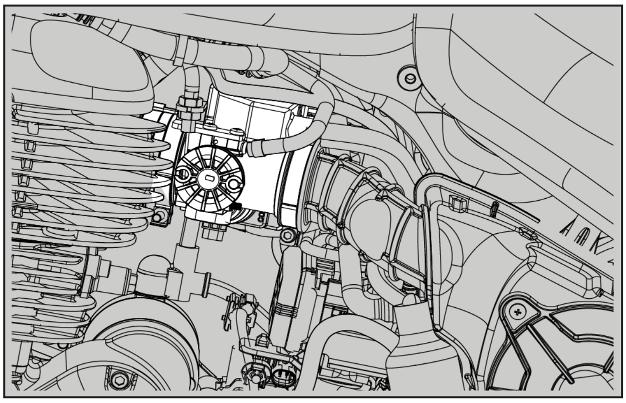
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/oxygen sensor coupler*

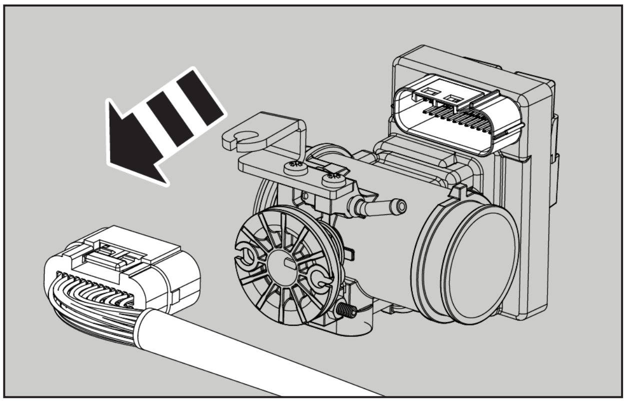
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

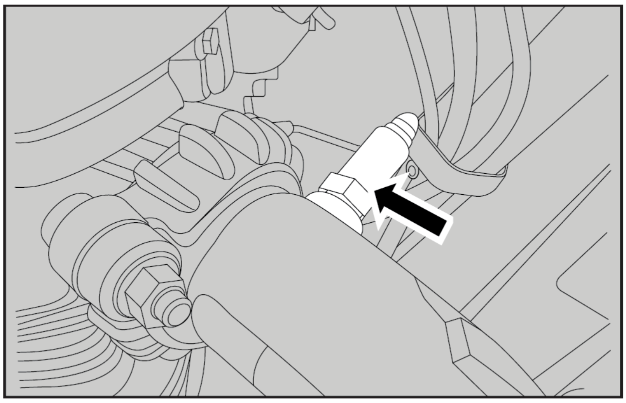
- ECU is located in the throttle body assembly



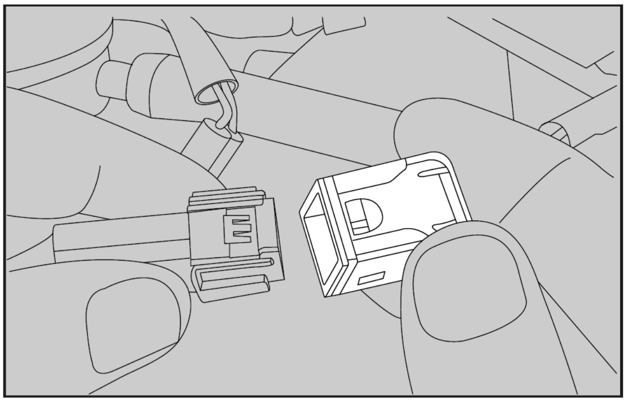
- Disconnect ECU coupler from ECU.



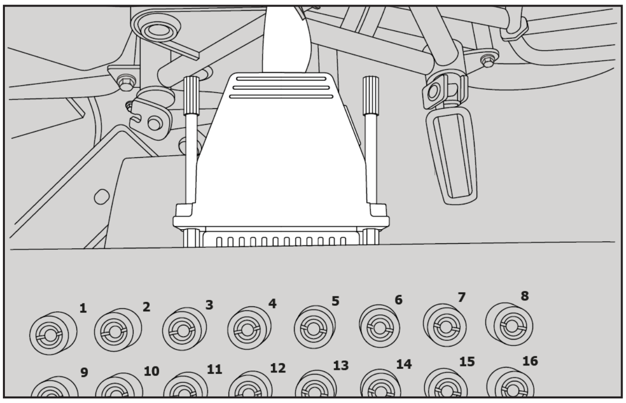
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.



- Connect ECU Breakout box to ECU breakout box harness


1
2
3
4
5
6
7
8
9
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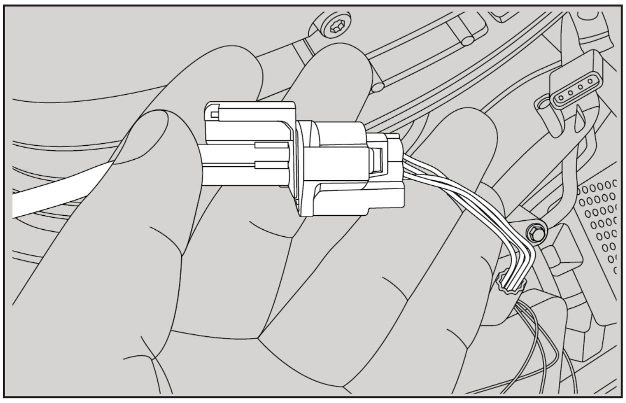
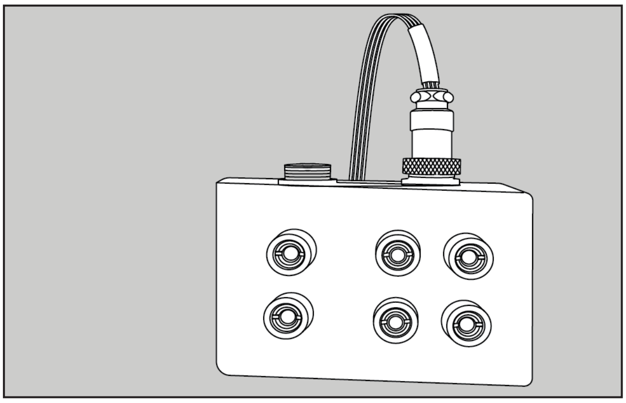
11
12
13
14
15
16

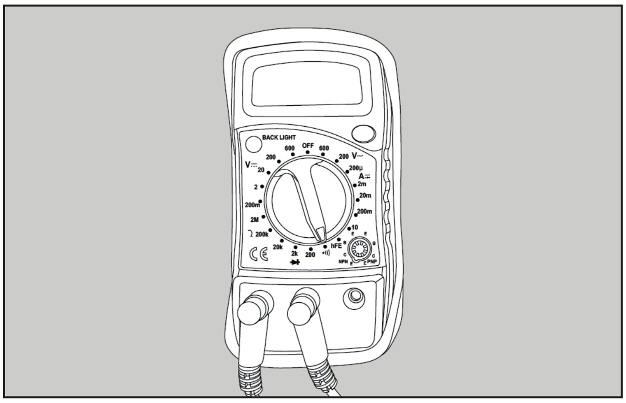
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



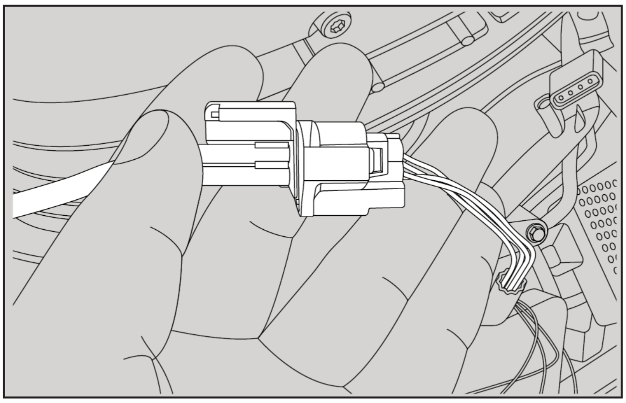


a. To check Continuity of Wiring harness

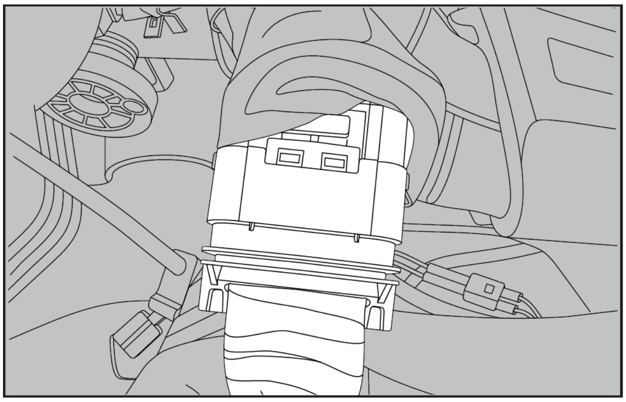
- Keep the multimeter in continuity mode


BACK LIGHT
OFF
600
200
V
A
hFE
NPN
PNP

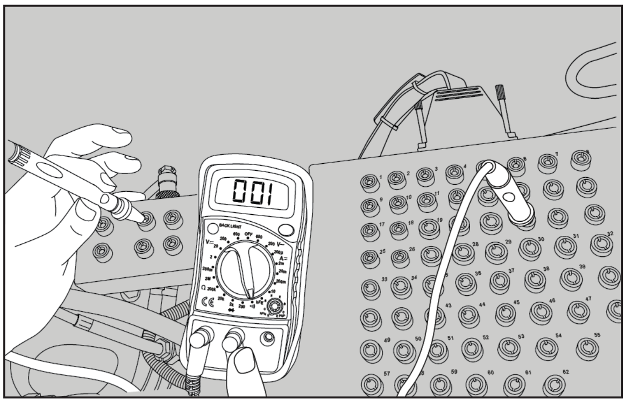
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



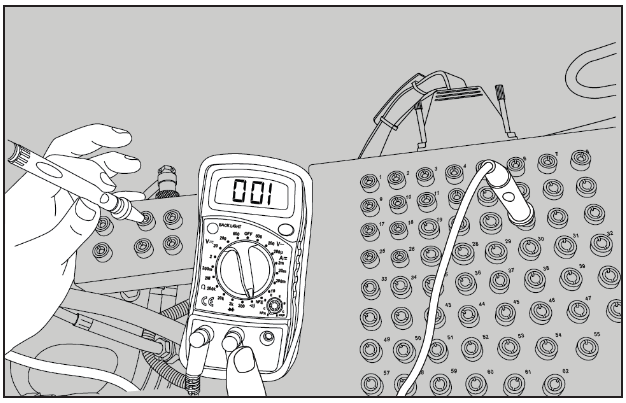
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



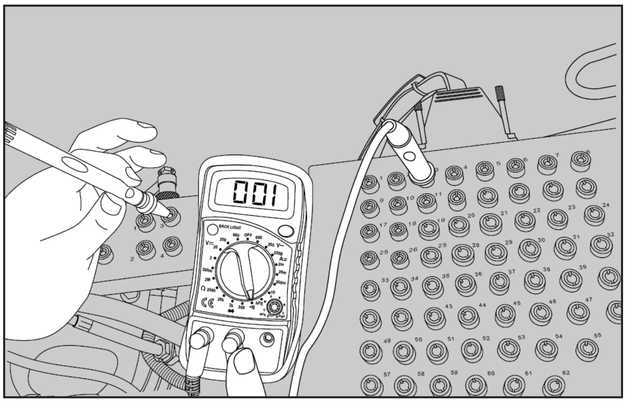
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



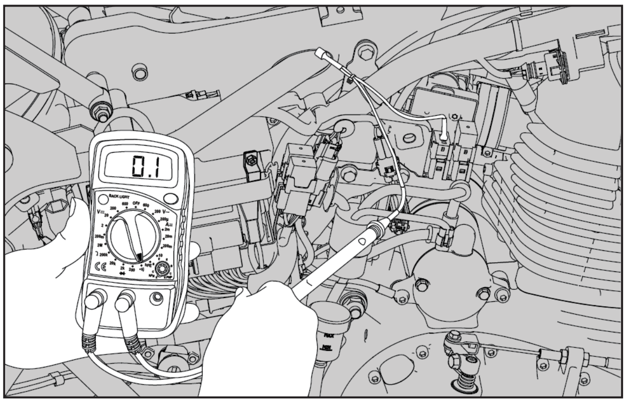
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

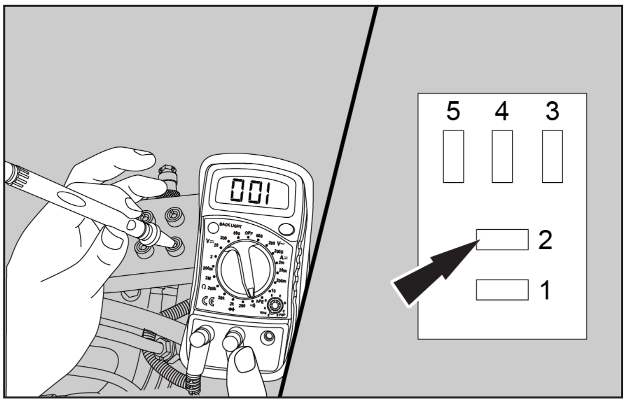


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



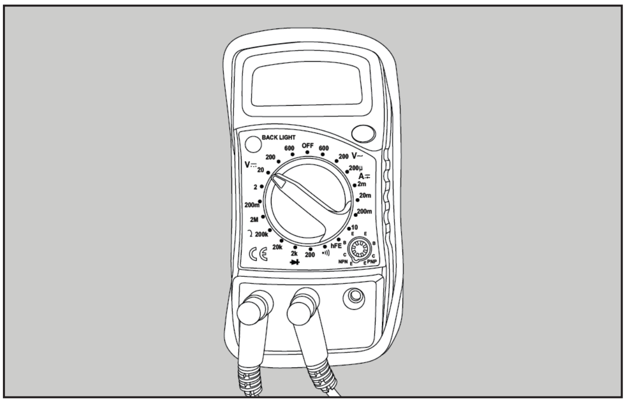
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



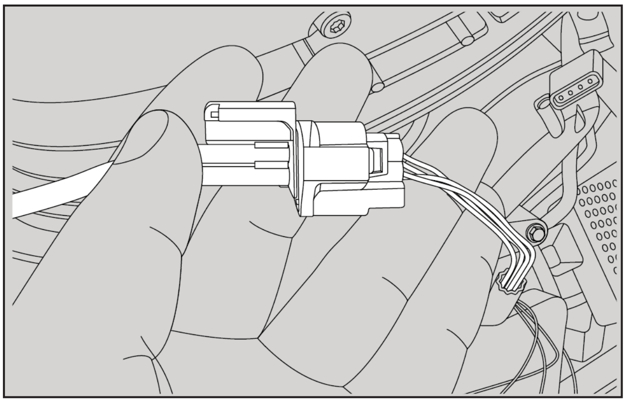


C. To check output voltage

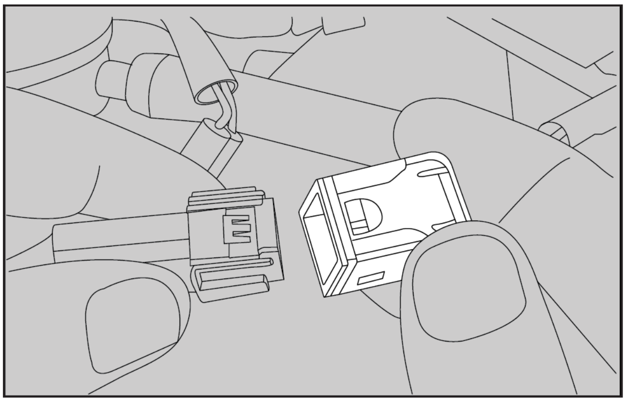
- Keep the multimeter in voltage mode (20V)



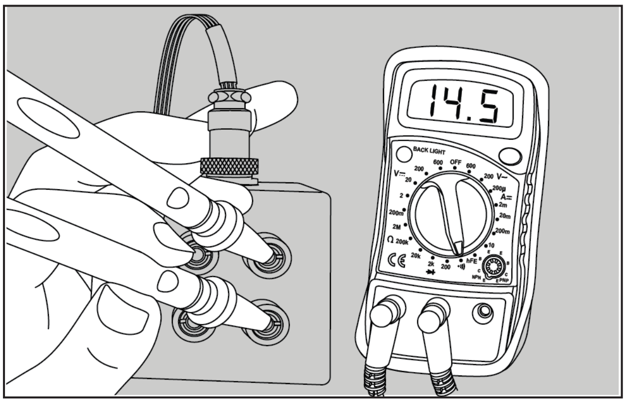
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

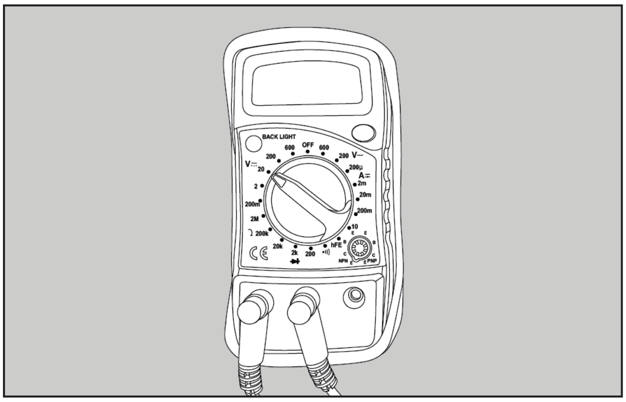


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

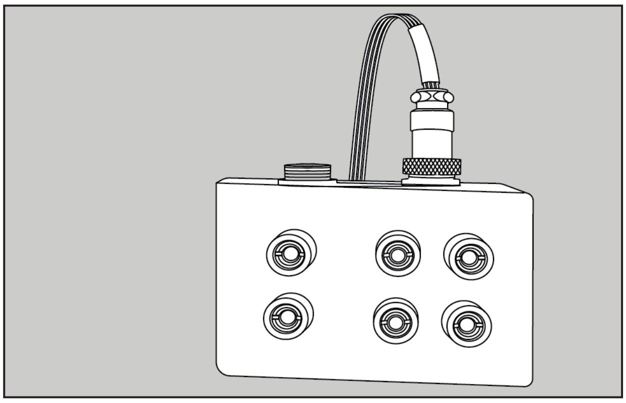


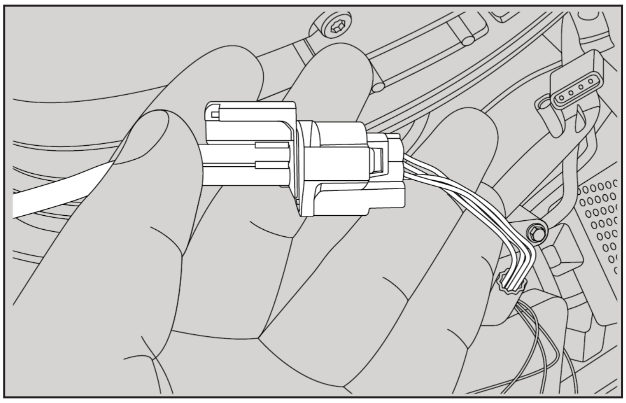
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

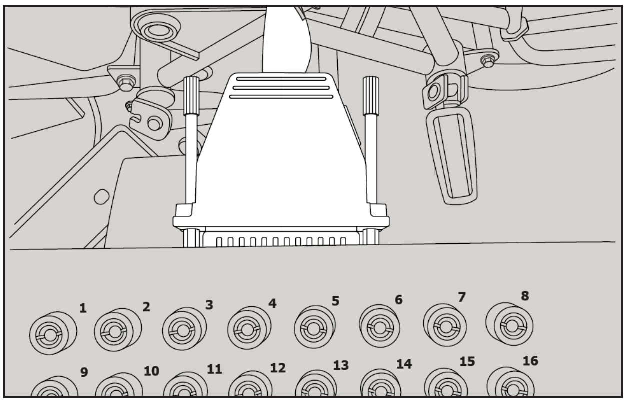


- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler





- Similarly, connect the ECU breakout box to ECU and wiring harness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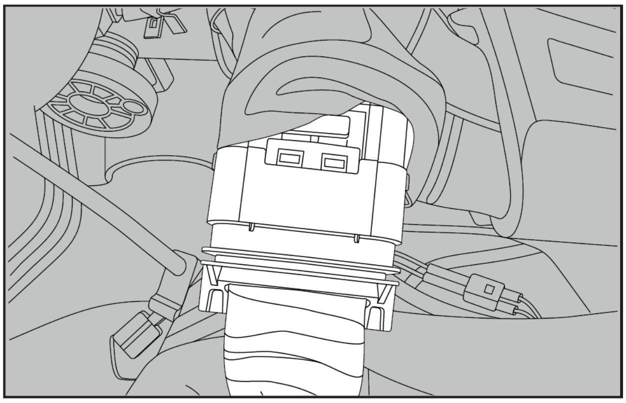
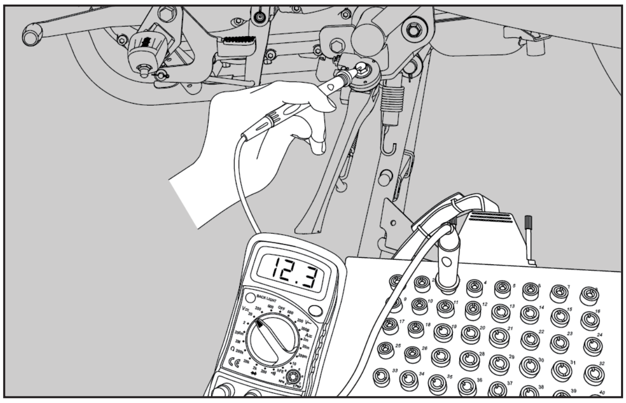
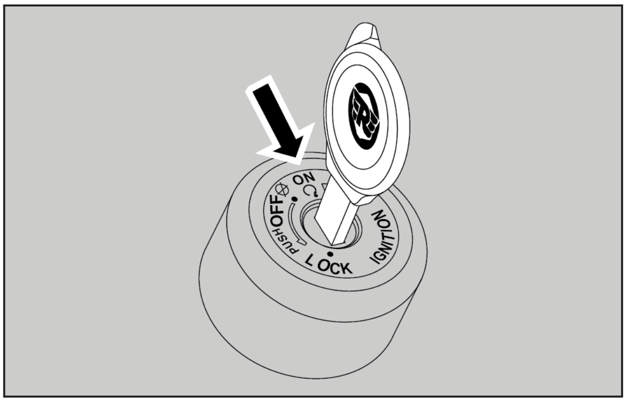
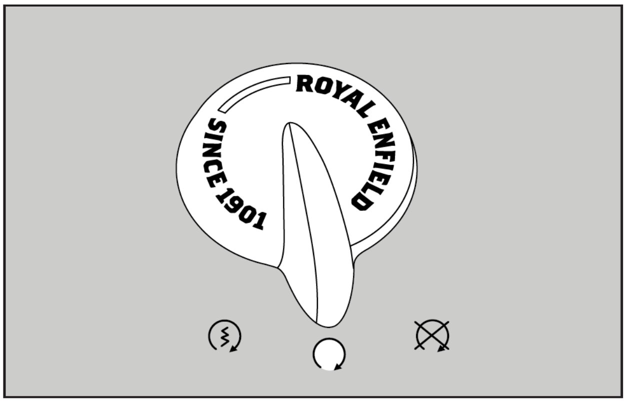


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

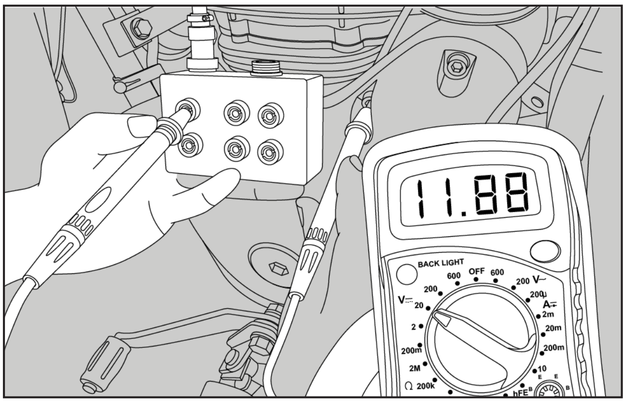


- Turn "ON" the ignition and kill switch


ON
OFF
PUSH
LOCK
IGNITION

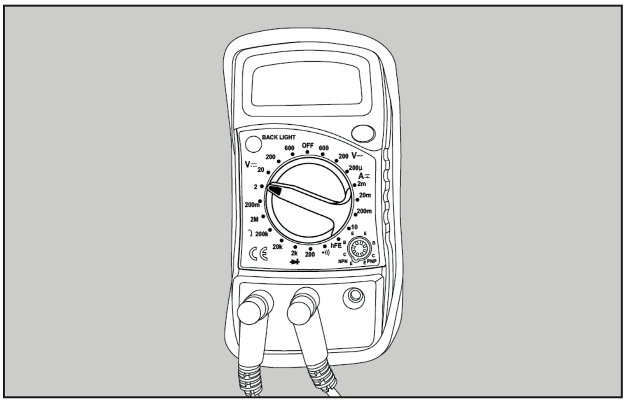

ROYAL ENFIELD
SINCE 1901

- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

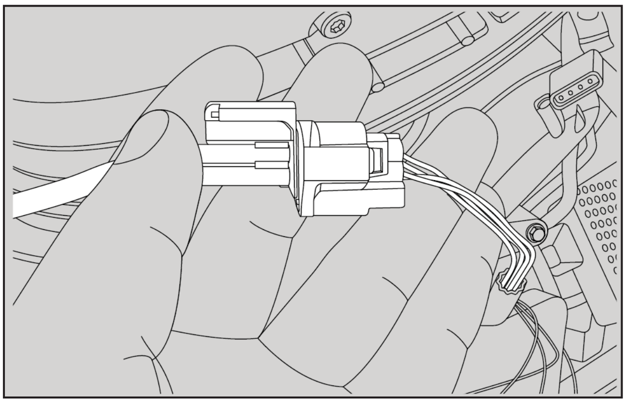

11.88
BACK LIGHT
OFF

To Check output voltage check

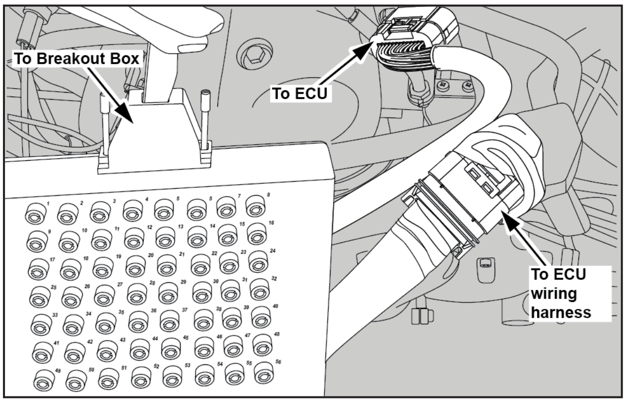
- Keep the multimeter in Voltage mode (2 V).


BACK LIGHT
OFF

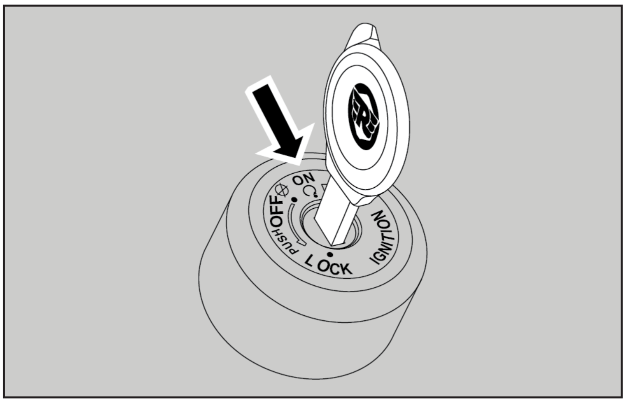
- Connect the female end of the Sensor breakout harness into the sensor coupler

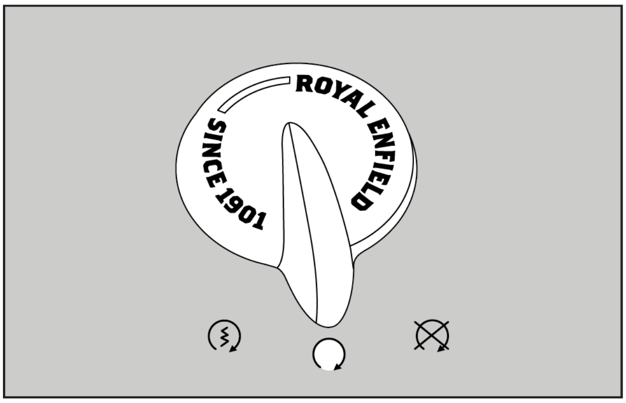


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn “ON” the kill switch and ignition switch

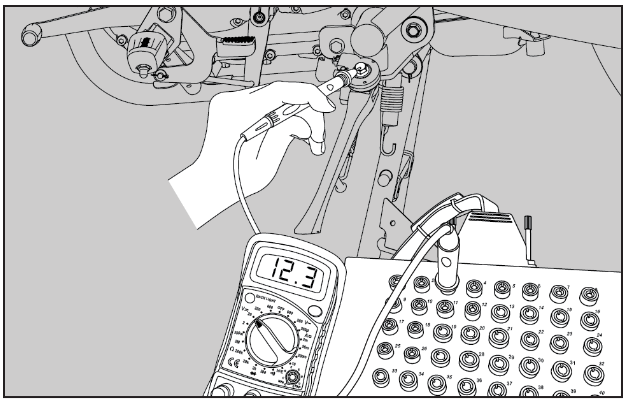

ON
OFF
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

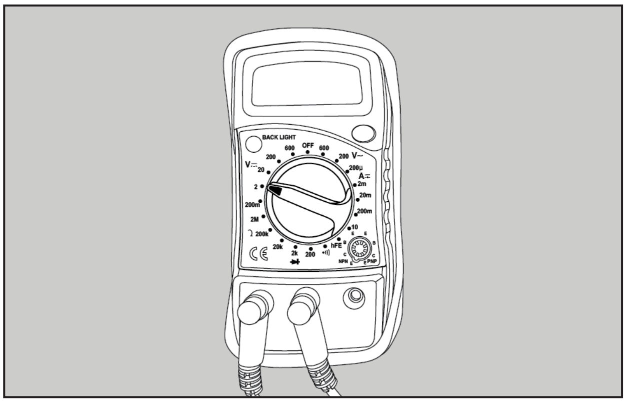
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



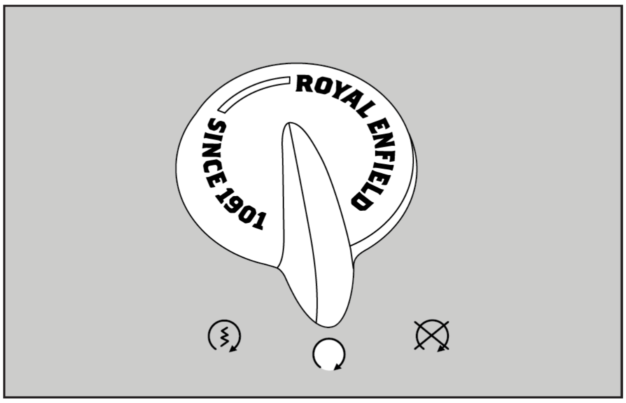
- Switch “OFF” the Engine

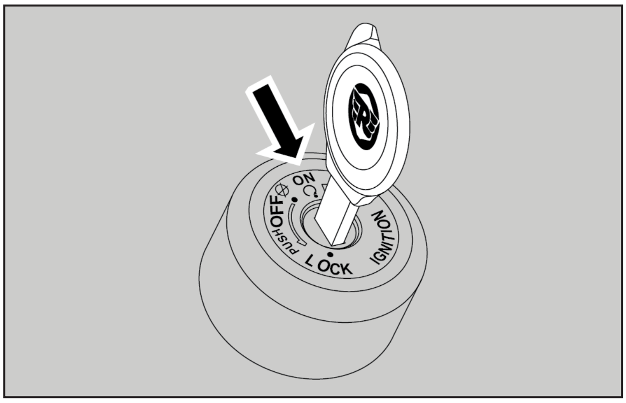
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

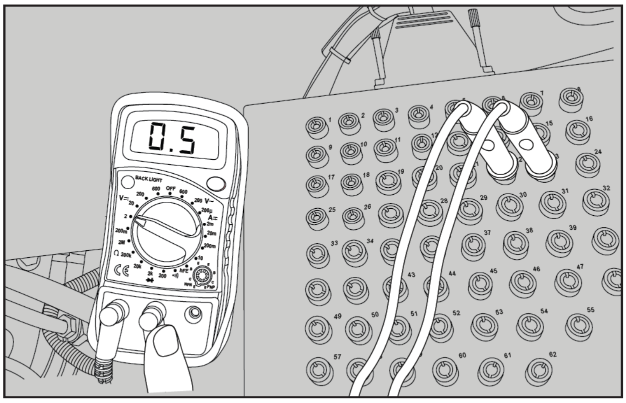


- Turn “ON” the Ignition switch and kill switch





- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU break outbox



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the Heater output voltage is 0V (After 10 sec from engine start) then the issue exists in either Sensor heater or ECU
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), you replace with Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) you have to replace the ECU.

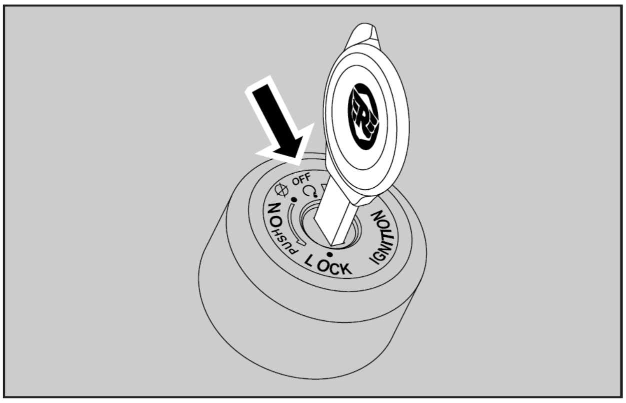
It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

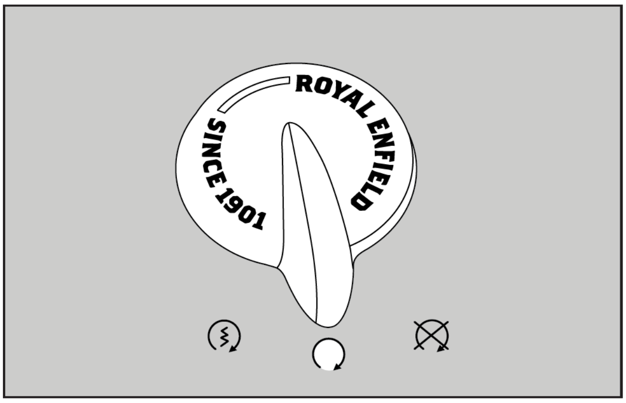
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

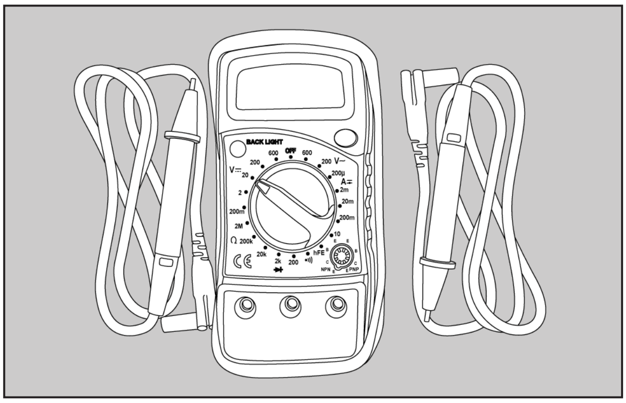
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)



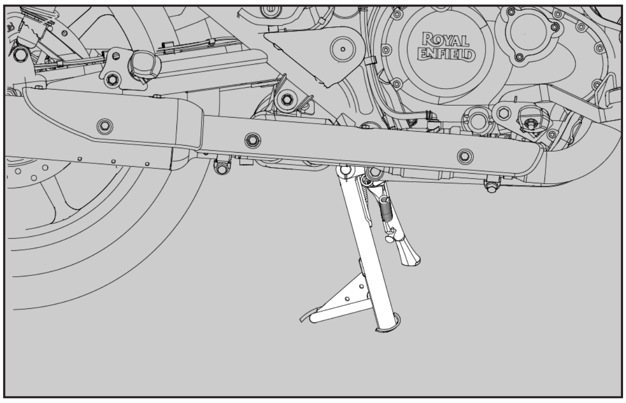
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

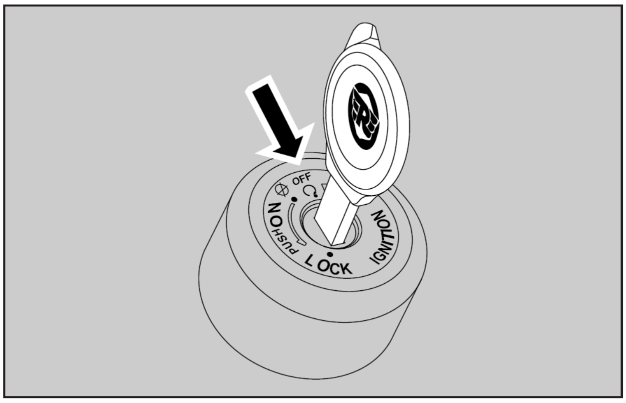
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

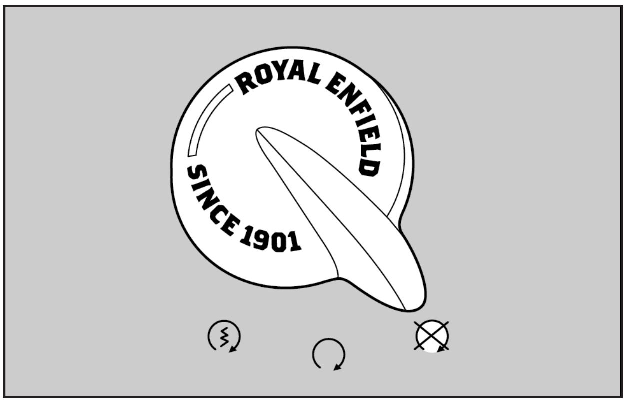
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

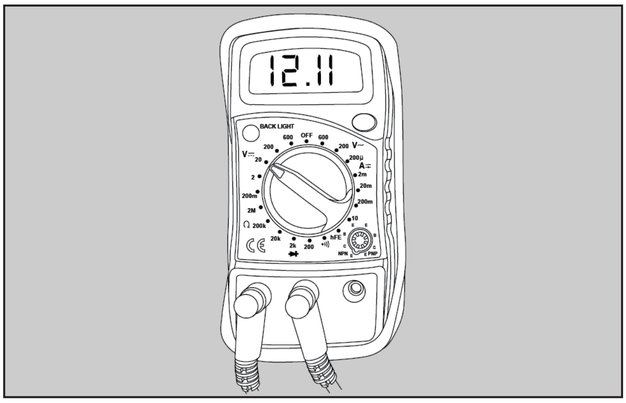


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

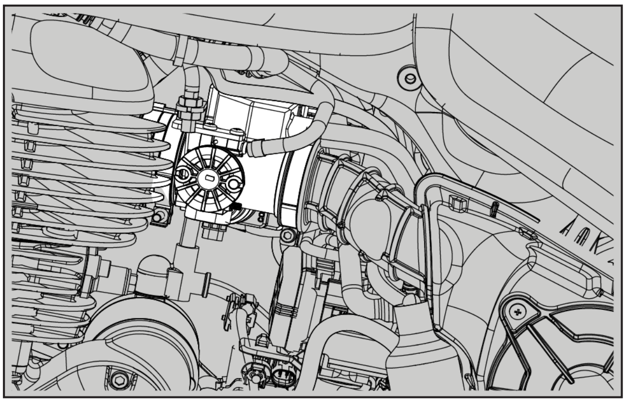
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

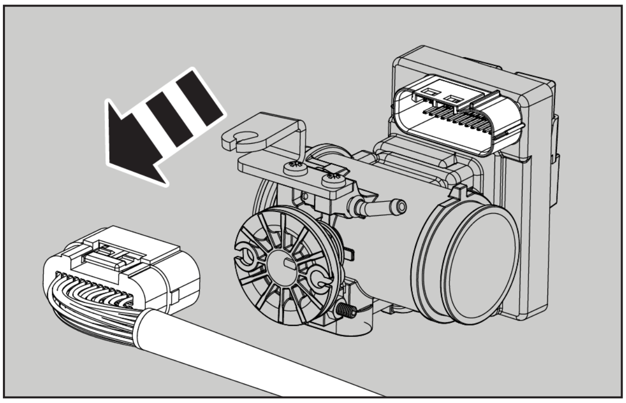
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

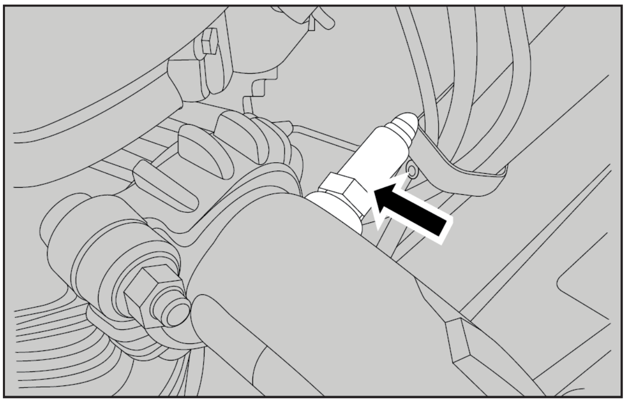
- ECU is located on the Throttle body assembly



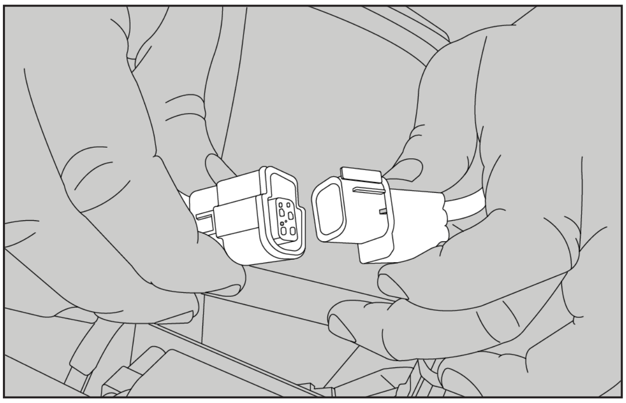
- Disconnect the ECU wiring harness coupler from ECU



- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



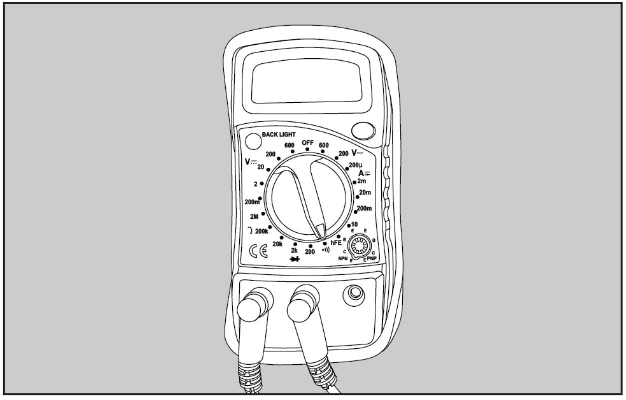
- Disconnect the oxygen sensor coupler.



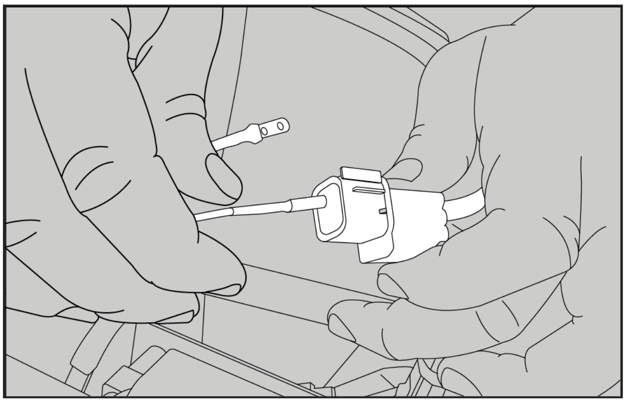
To check Continuity of the Wiring Harness

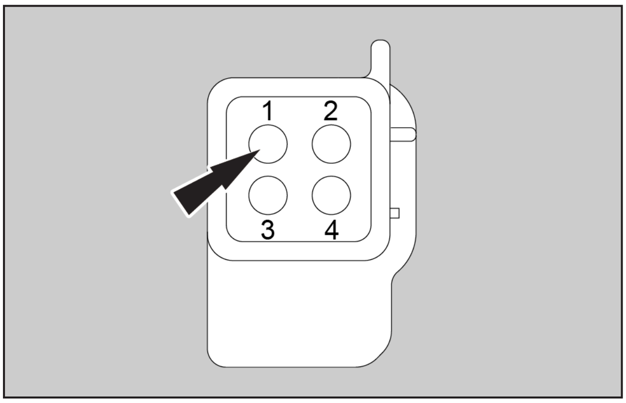
STEP 1:

- Keep the multimeter in continuity mode

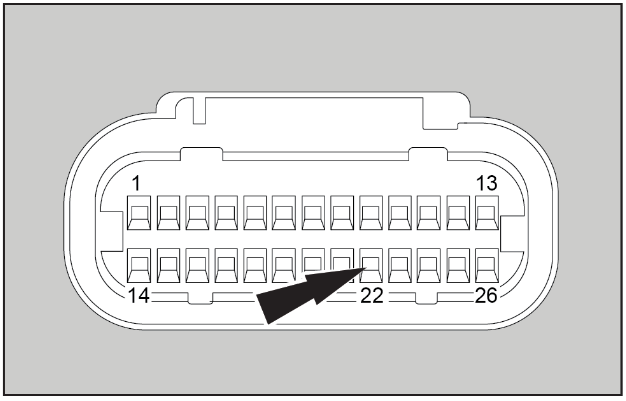


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

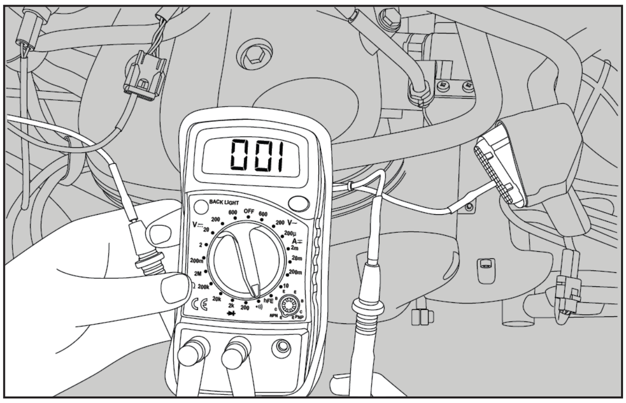




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

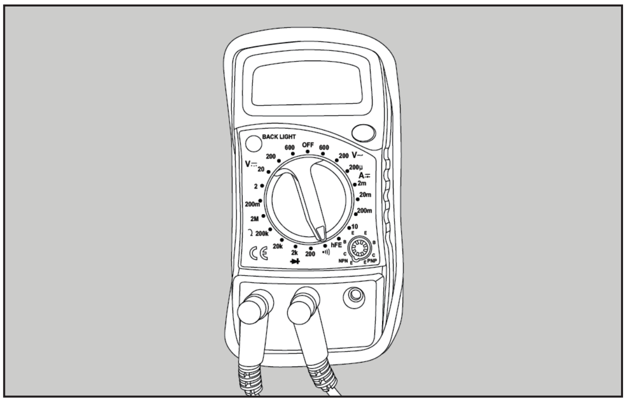


- Check for continuity (Beep Sound from the multimeter)

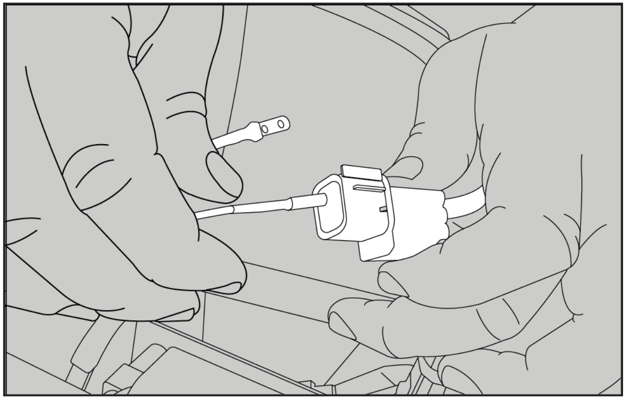


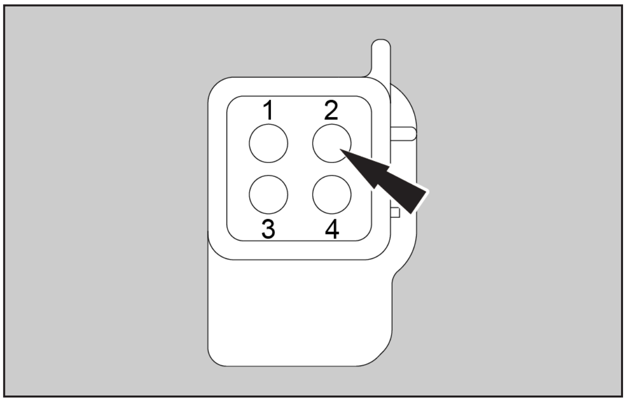
STEP2:

- Keep the multimeter in continuity mode

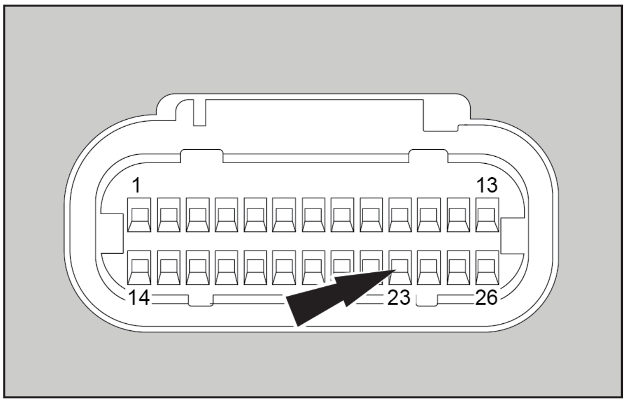


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 3 of the wiring socket.

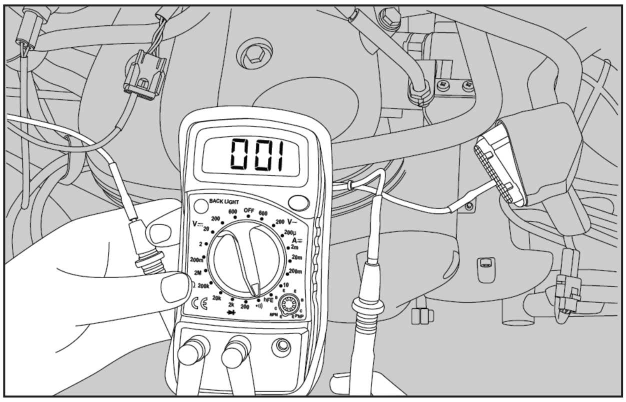




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

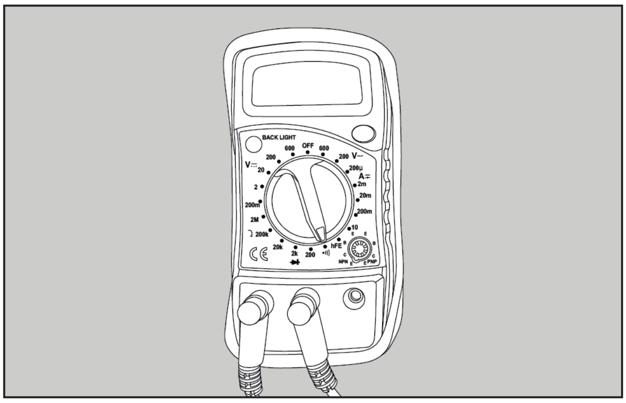


- Check for continuity (Beep Sound) from the multimeter

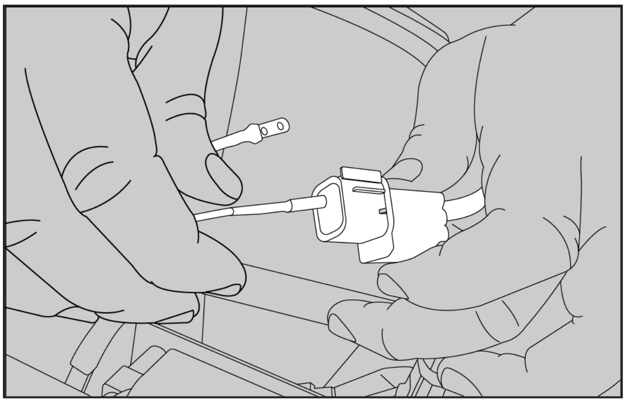


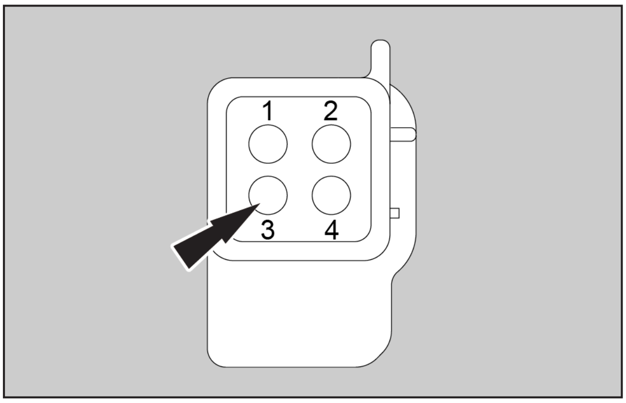
STEP 3:

- Keep the multimeter in continuity mode

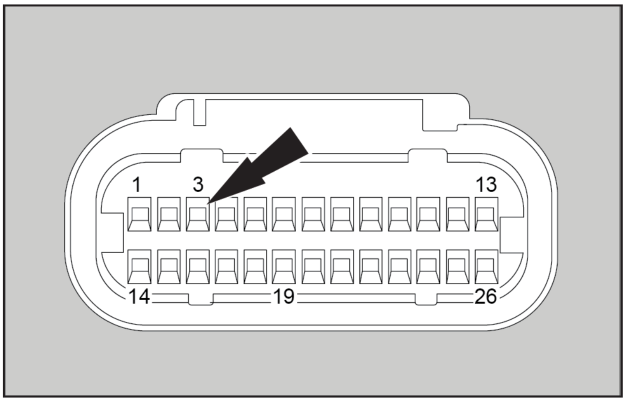


- Connect Test lead wire 60 series (blue color) with the yellow tag to Pin 3 of the wiring socket.

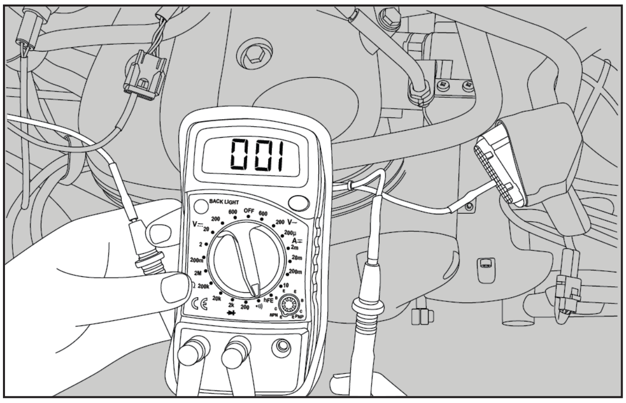




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

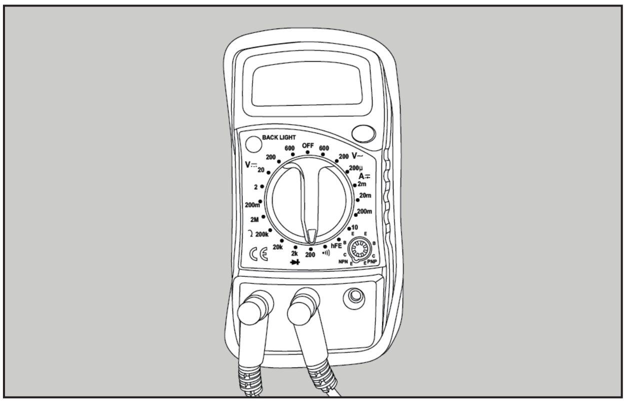


- Check for continuity (Beep Sound) from the multimeter

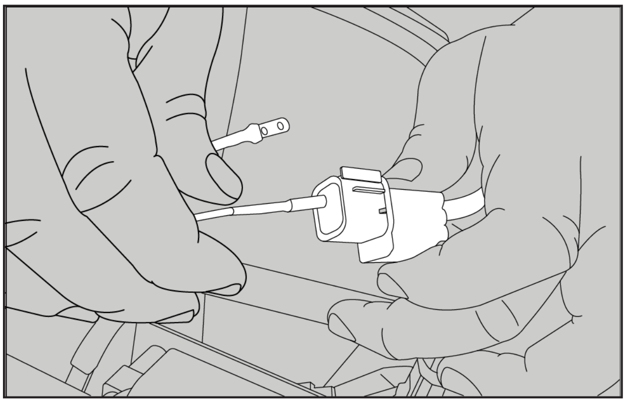


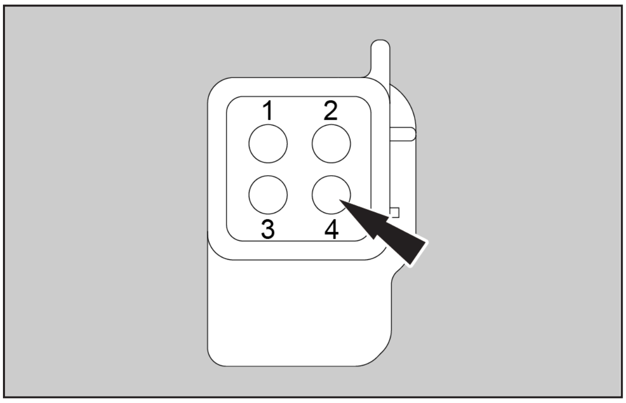
STEP 4:

- Keep the multimeter in continuity mode

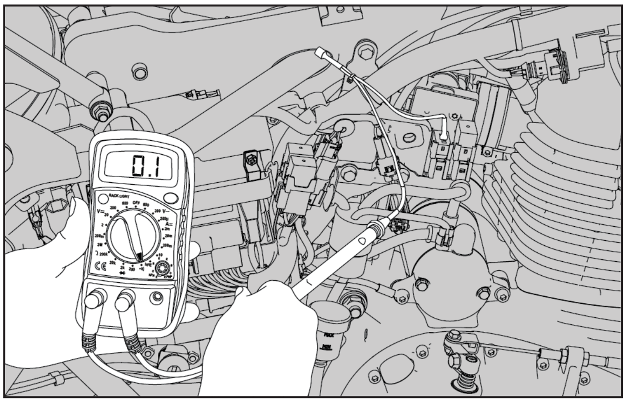


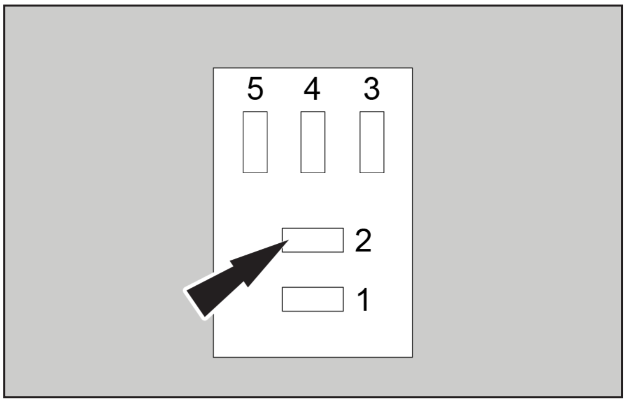
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



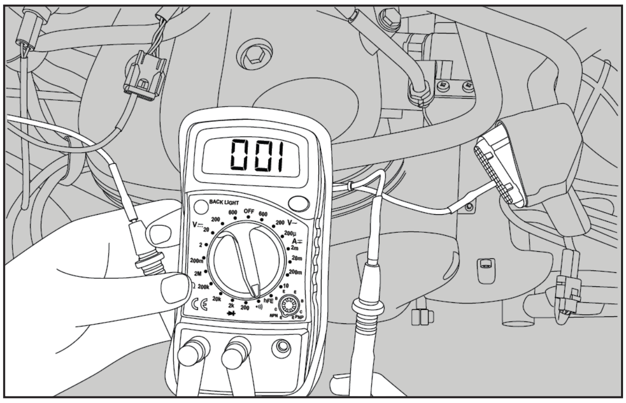


- Disconnect power relay and connect test lead wire into relay socket pin 2.





- Check for continuity (Beep Sound) from the multimeter

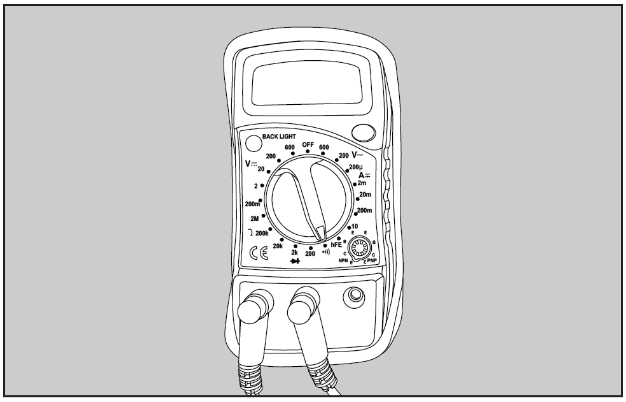


⚠ CAUTION

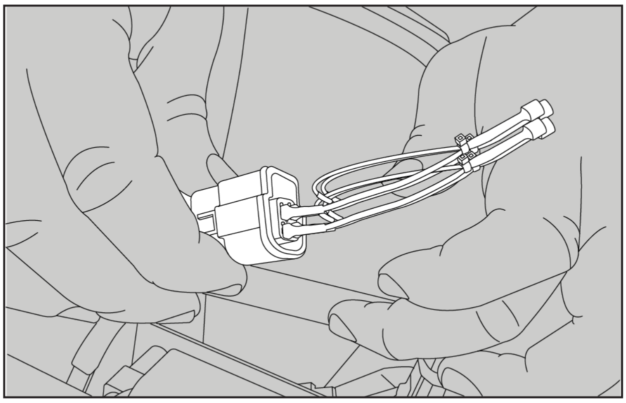
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the resistance of the sensor

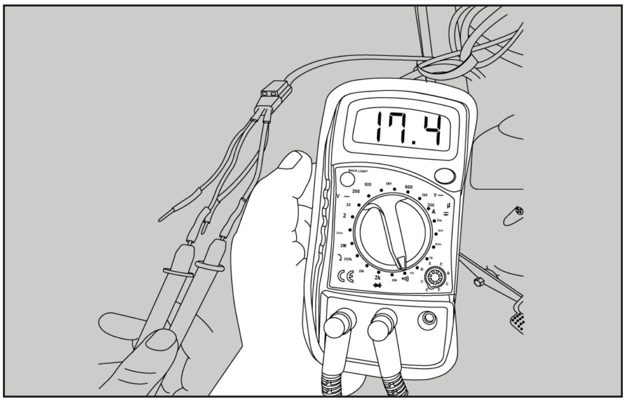
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

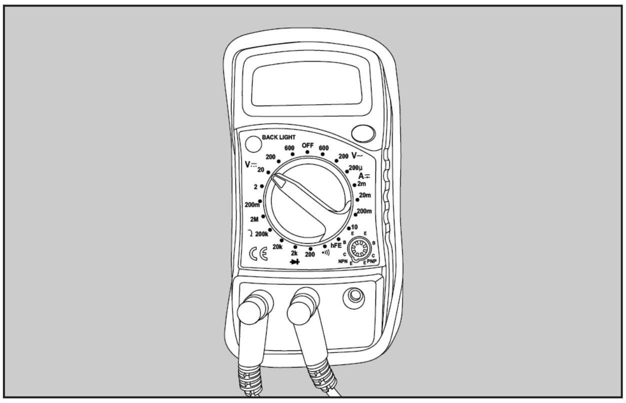


⚠ CAUTION

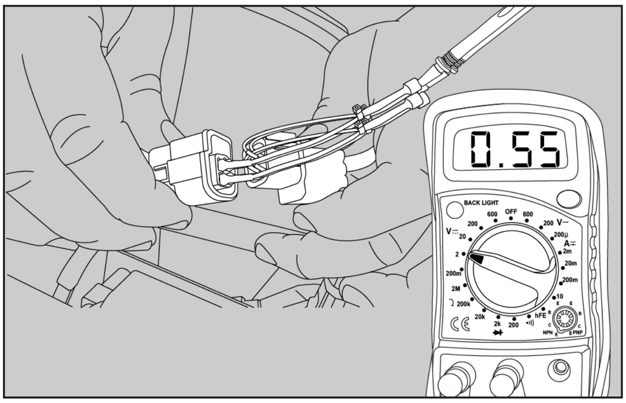
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn "ON" the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)

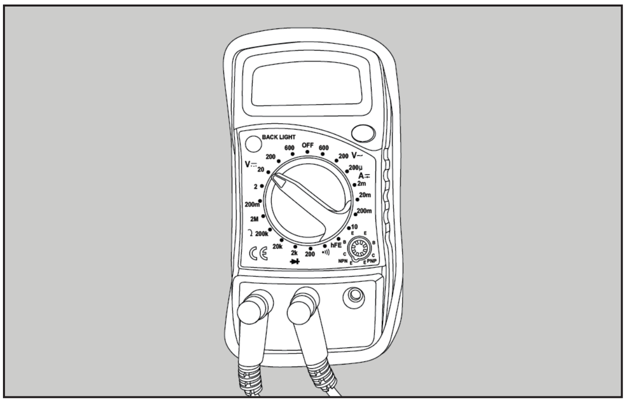


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



d. Decision Point:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13 to17.5 Ohms @ 30 5 °C), you replace with Lambda/Oxygen Sensor
- If the voltage is not meeting the specified limit (0.4 V to 0.55 V)and (0.1V to 0.8 V at idling) and if continuity is available you have to replace the ECU.

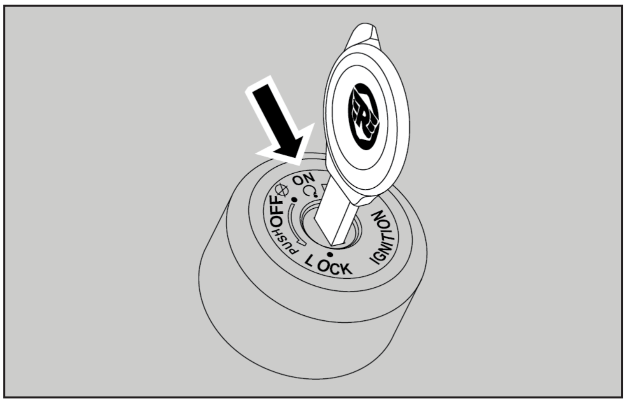
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

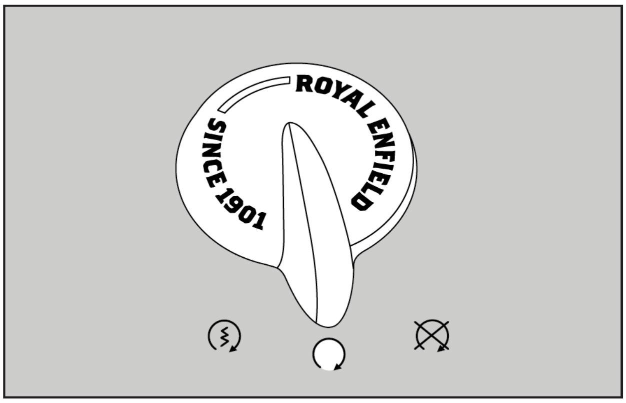
1.3.1. To check the Output voltage

⚠ CAUTION

With sensor connector disconnected and ignition is switched “ON”, DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in “ON” Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Switch “OFF” the ignition key and again switch “ON” - repeat this cycle for 3 times till the MIL is “OFF”
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0134 - LAMBDA SENSOR HEATER DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0134	Lambda Sensor Signal	Oxygen Sensor Circuit Open

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P0134

Type of error : Oxygen Sensor Circuit Open

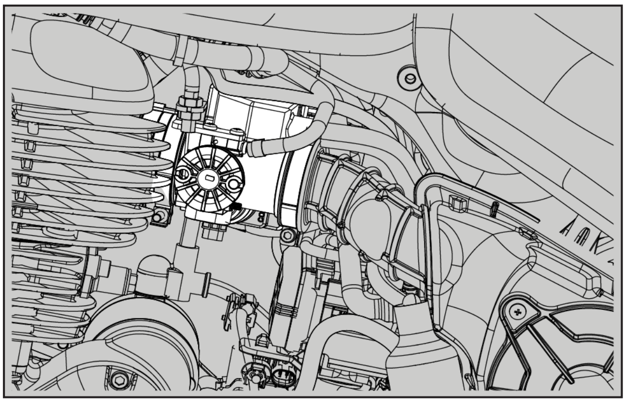
(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

b.Preliminary Checks (Basic Check Points):

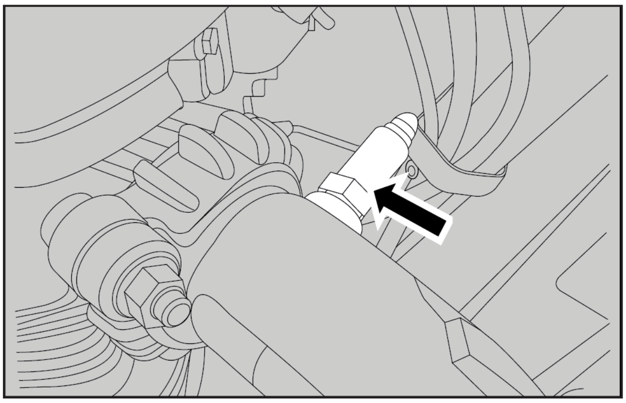
⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

⚠ CAUTION
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

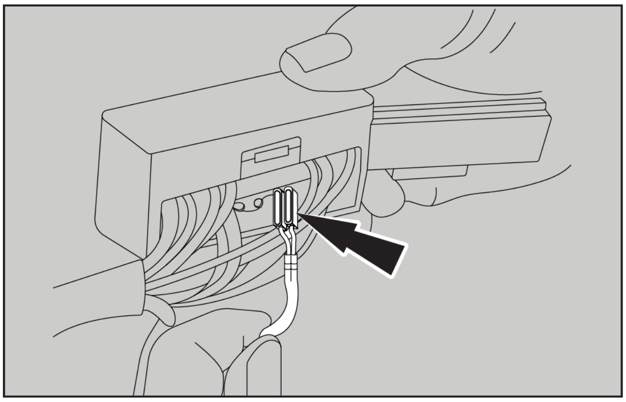
- ECU is located on the throttle body assembly



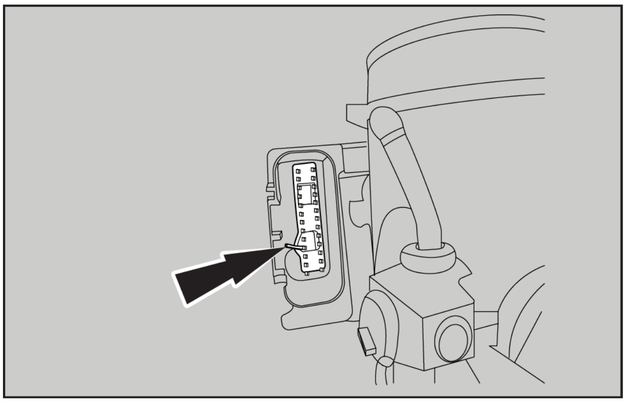
- The lambda sensor is located on the Exhaust pipe



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

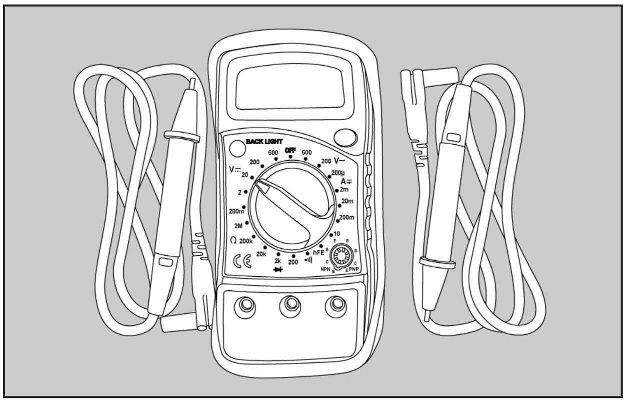
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

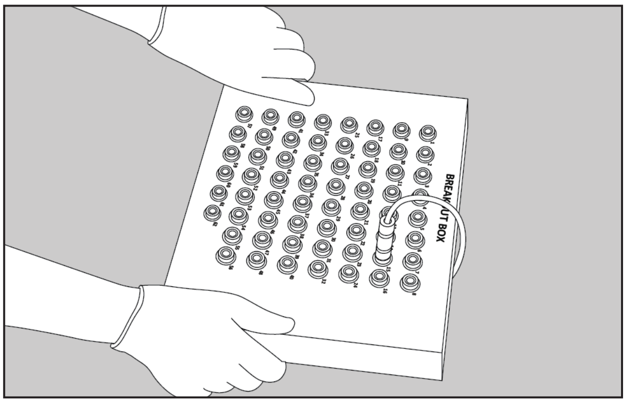
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

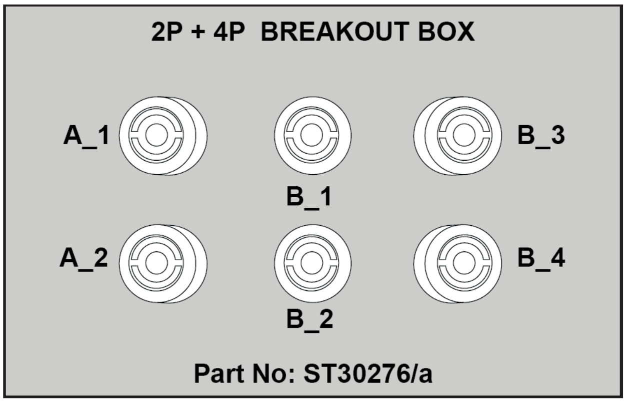
- **Tools Required**
- Multimeter (Universal)



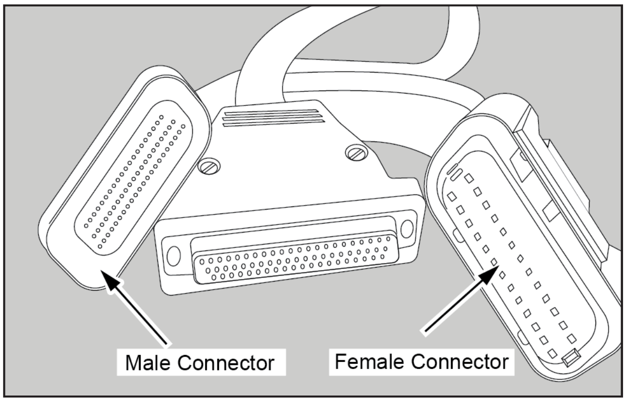
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit



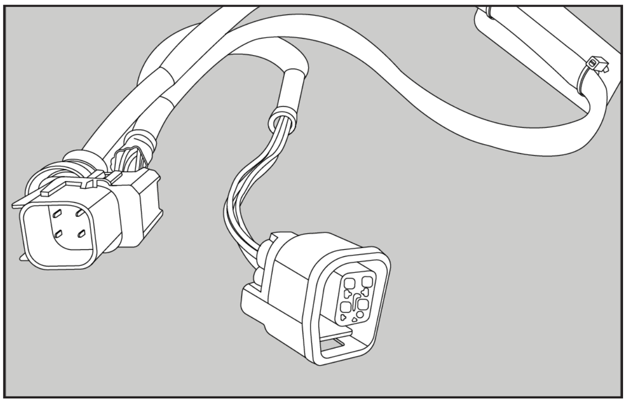
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

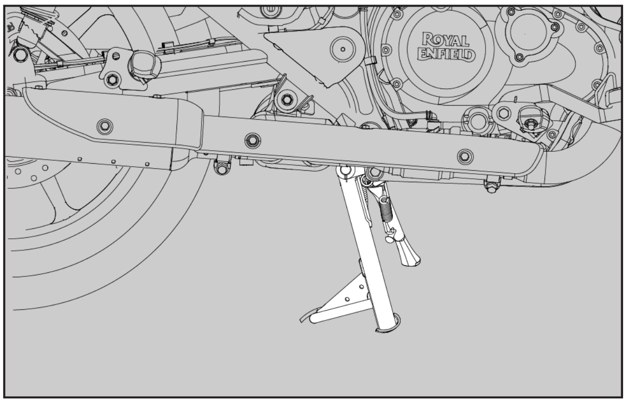

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

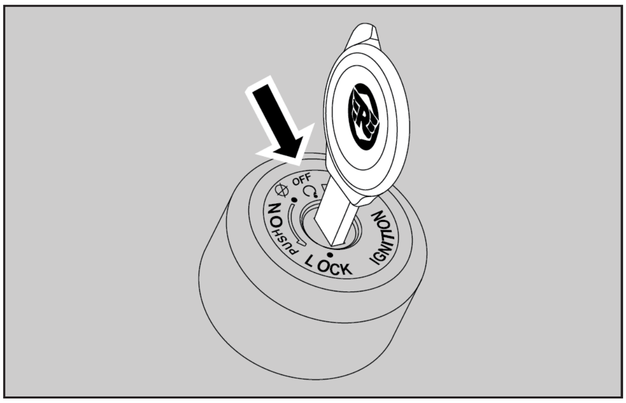


b. Pre-Checks:

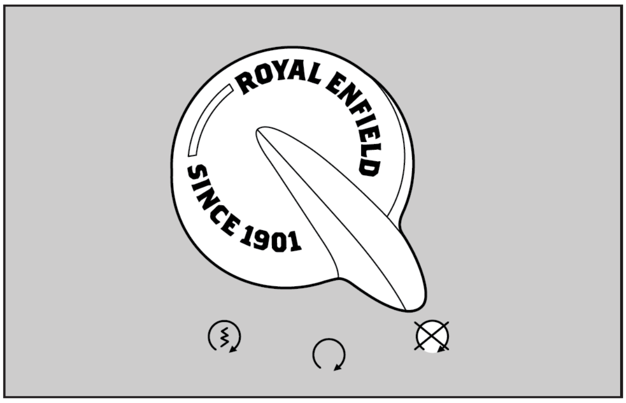
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

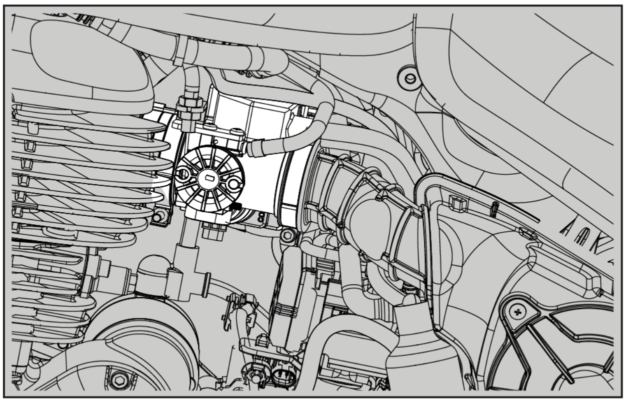
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

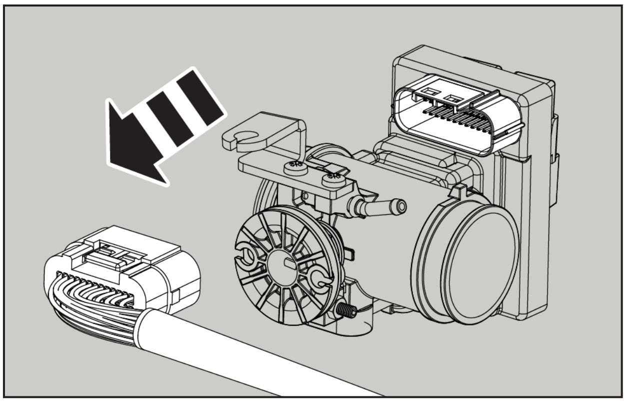
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

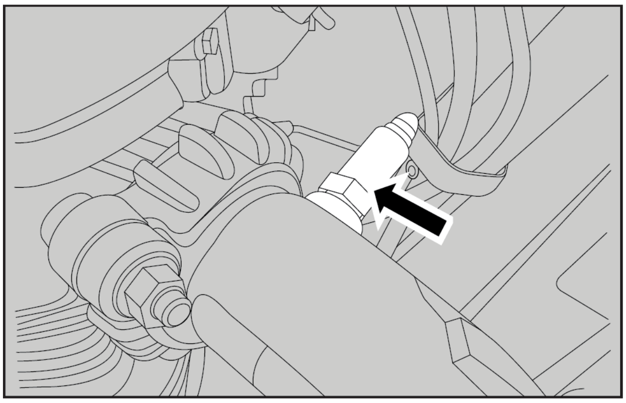
- ECU is located in the throttle body assembly



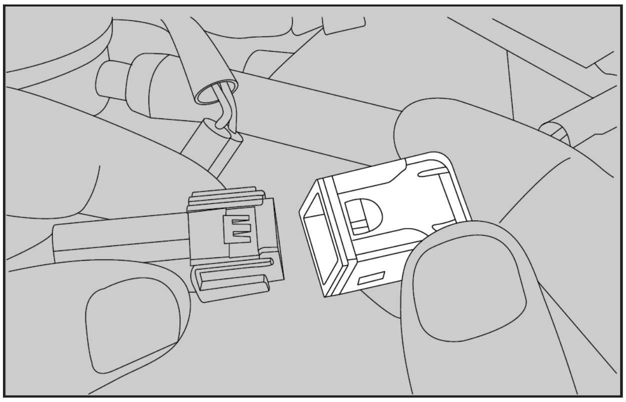
- Disconnect ECU coupler from ECU.



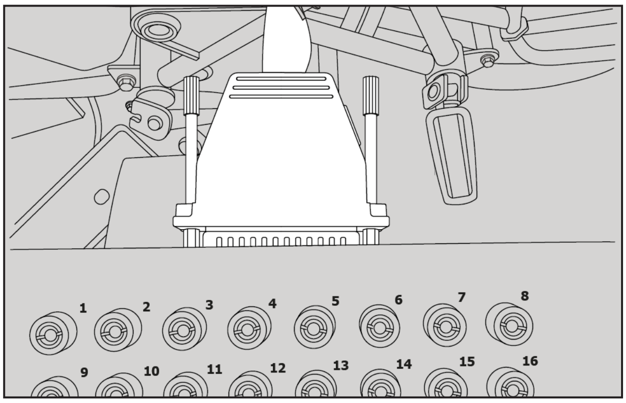
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



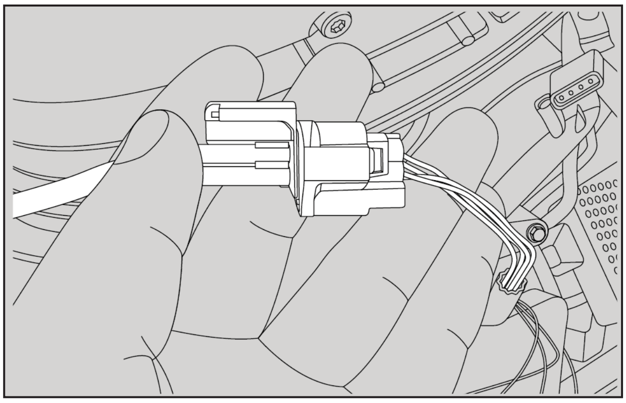
- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.

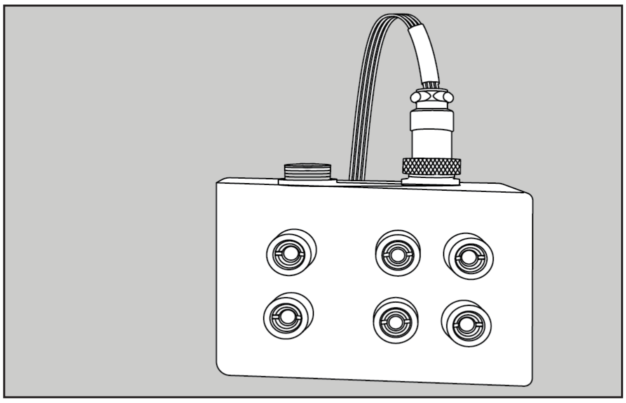


- Connect ECU Breakout box to ECU breakout box harness



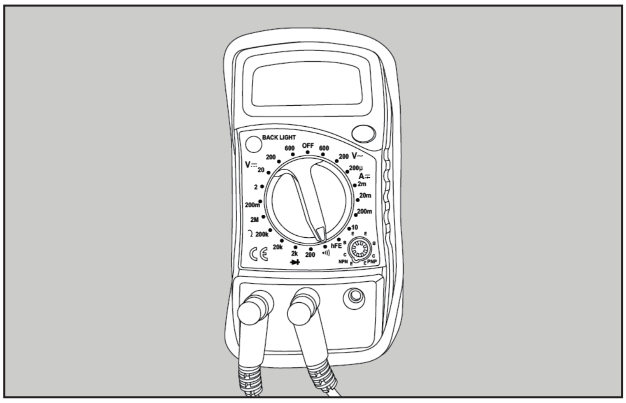
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



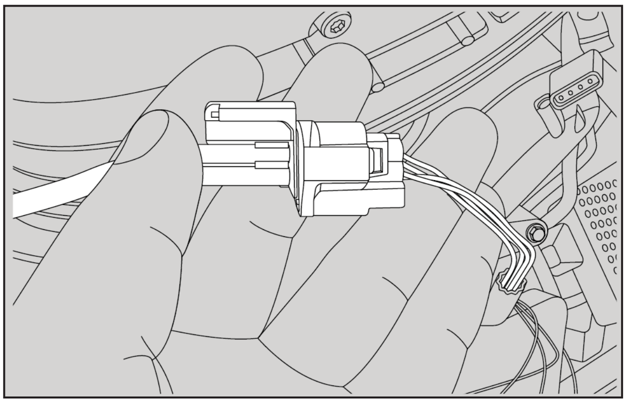


a. To check Continuity of Wiring harness

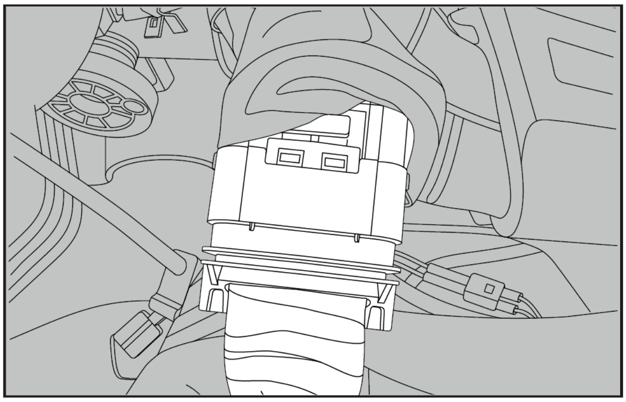
- Keep the multimeter in continuity mode



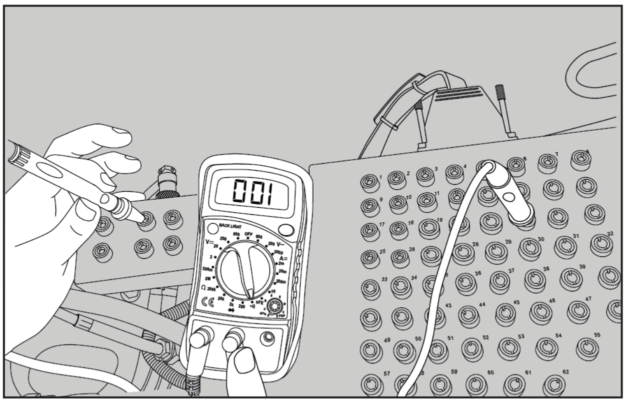
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



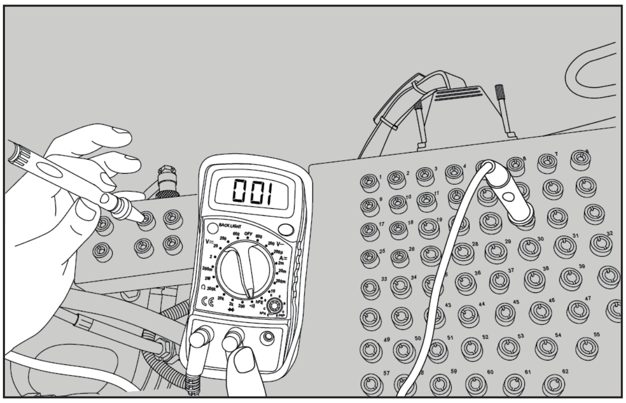
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



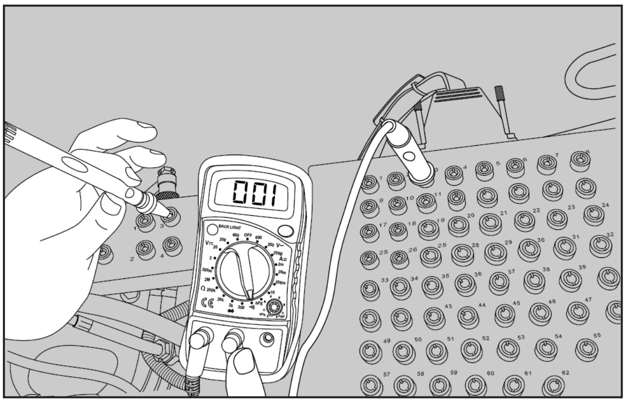
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



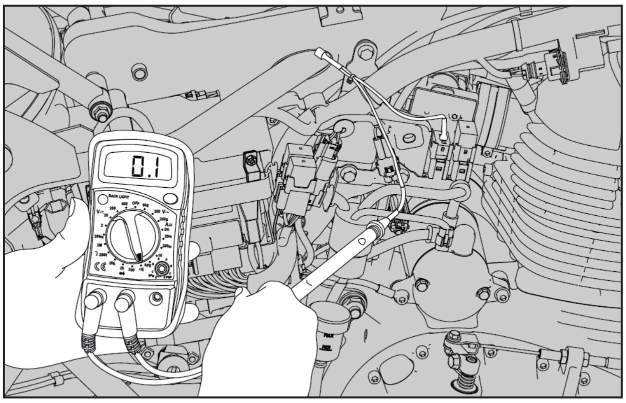
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

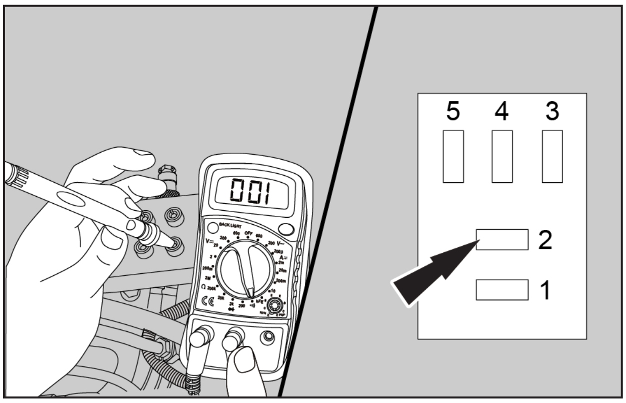


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



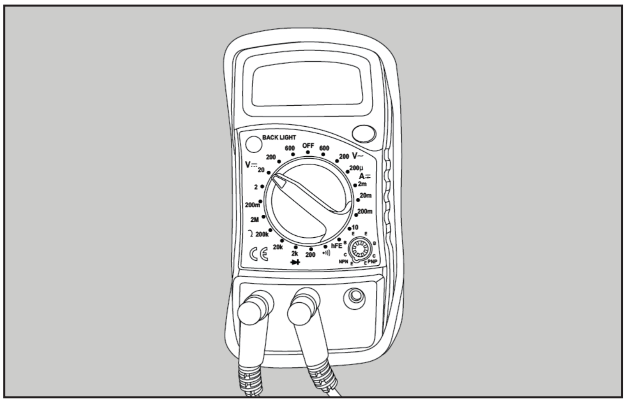
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



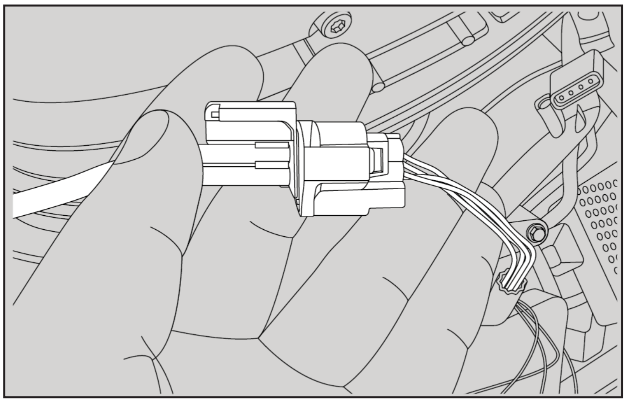


C. To check output voltage

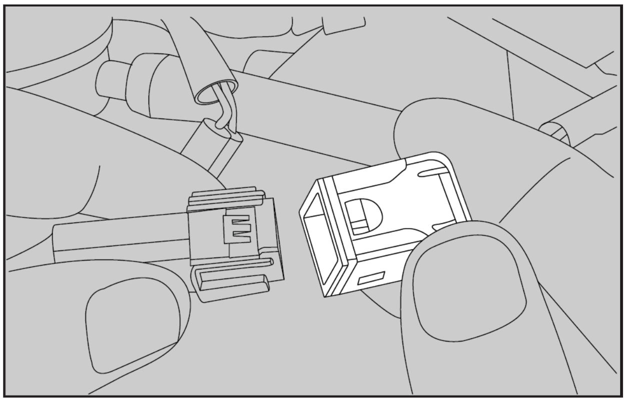
- Keep the multimeter in voltage mode (20V)


BACK LIGHT
OFF
600
200
V
A
hFE

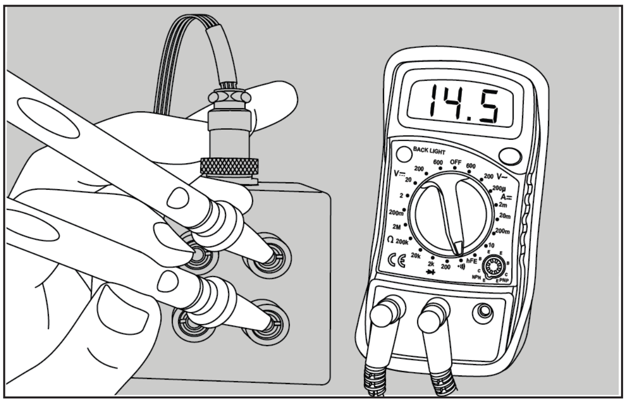
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

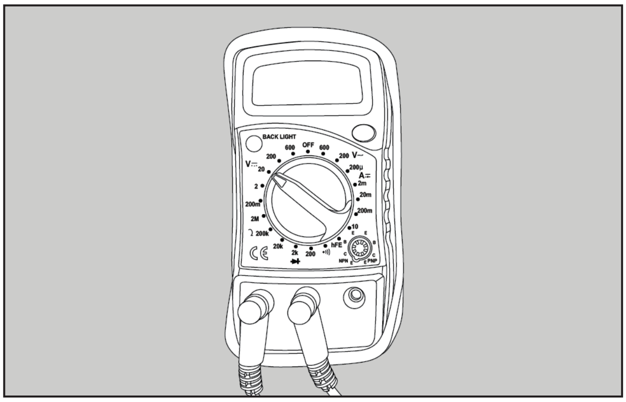


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

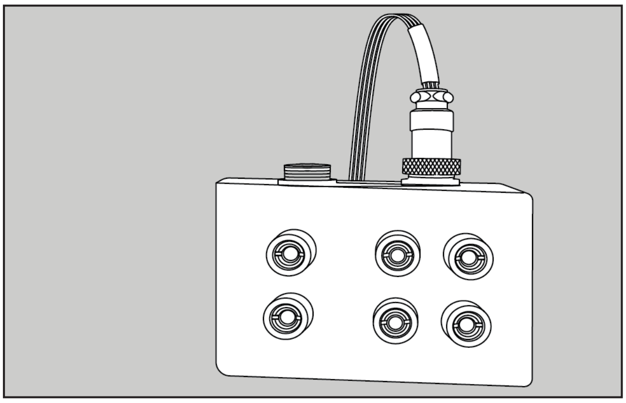

14.5
BACK LIGHT
OFF

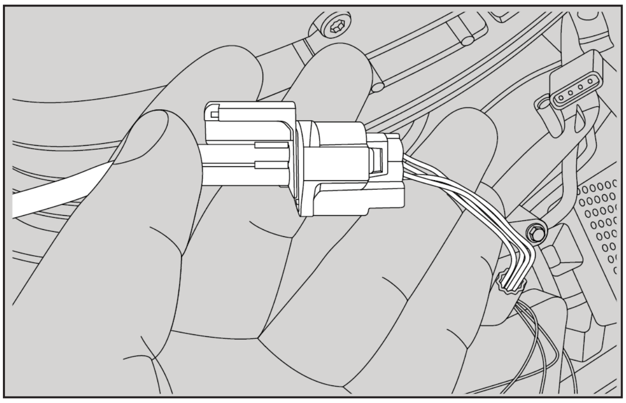
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

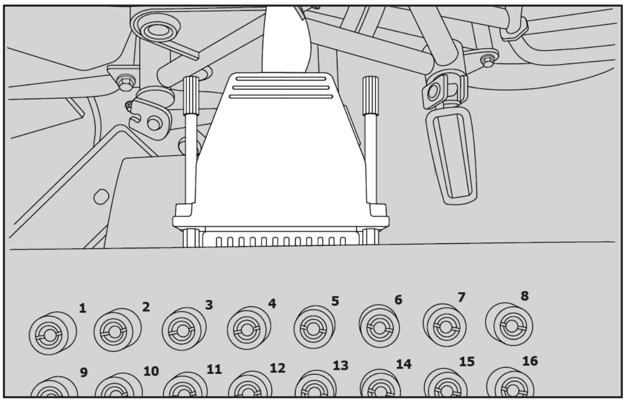

BACK LIGHT
OFF
600
200
V
A
hFE

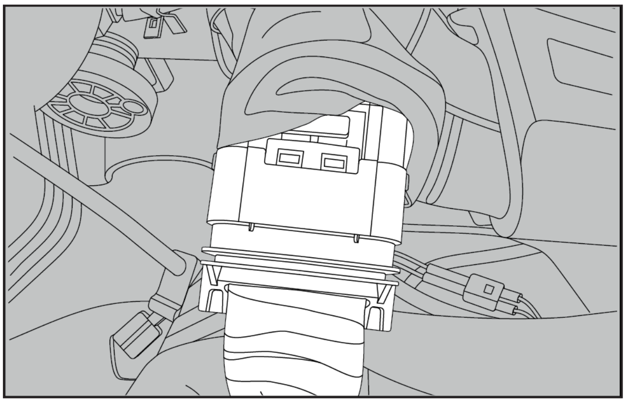
- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler



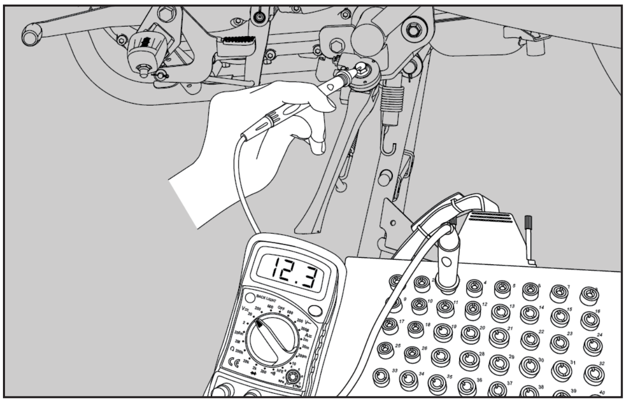


- Similarly, connect the ECU breakout box to ECU and wiring harness

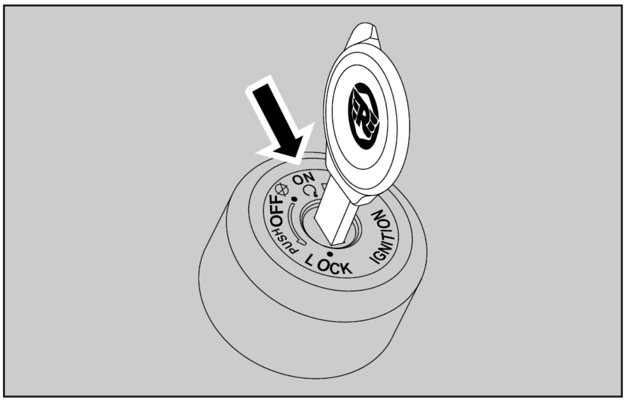

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

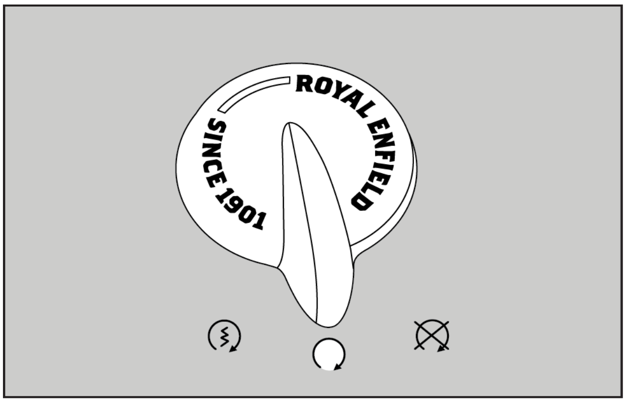


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

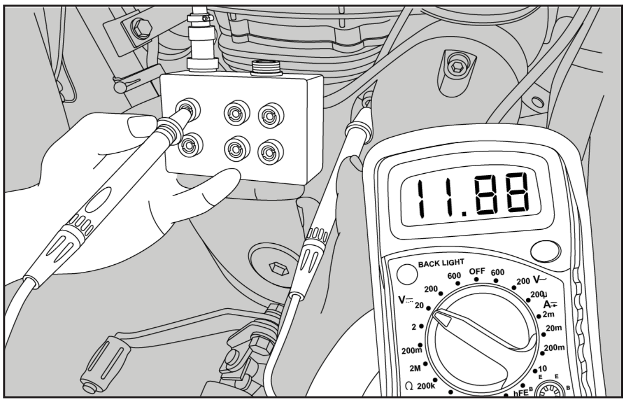


- Turn "ON" the ignition and kill switch


ON
OFF
PUSH
LOCK
IGNITION

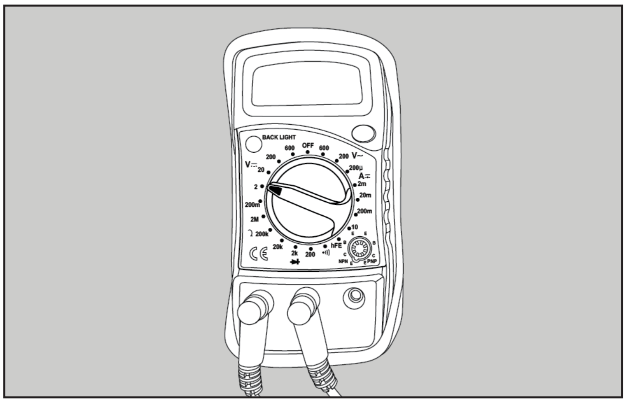

ROYAL ENFIELD
SINCE 1901

- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

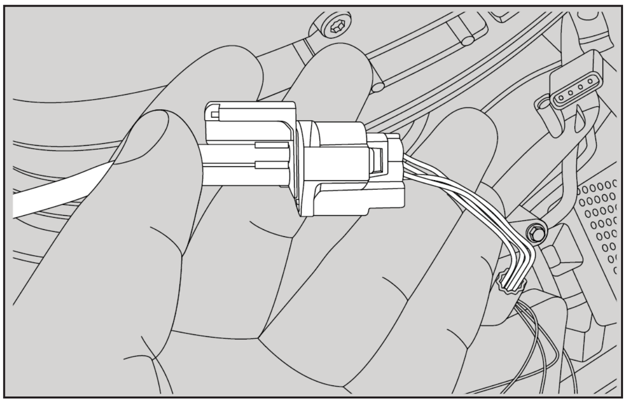


To Check output voltage check

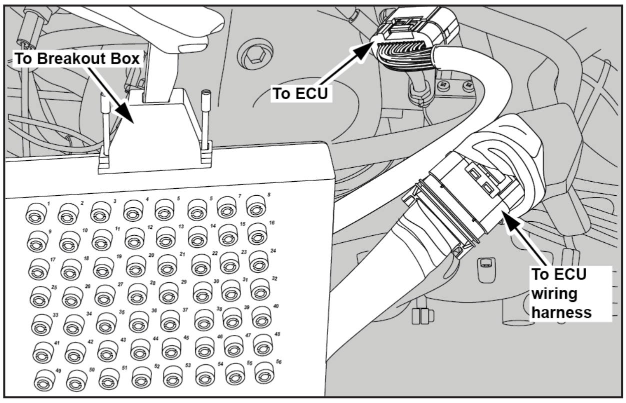
- Keep the multimeter in Voltage mode (2 V).



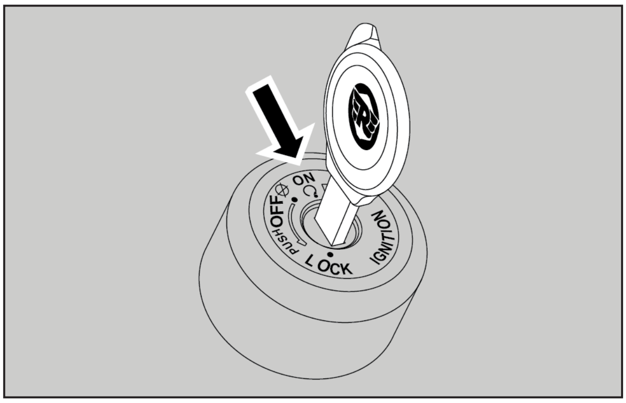
- Connect the female end of the Sensor breakout harness into the sensor coupler

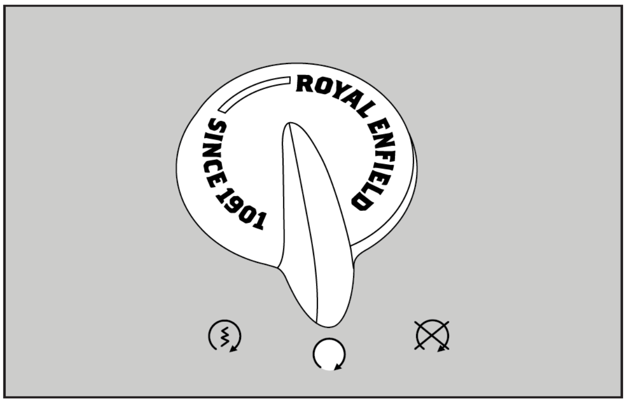


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn "ON" the kill switch and ignition switch

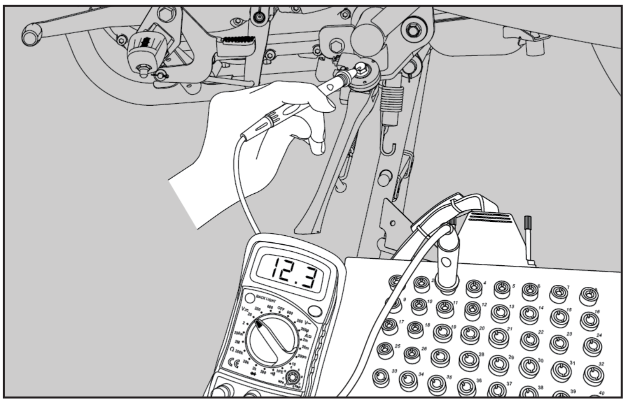

ON
OFF
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

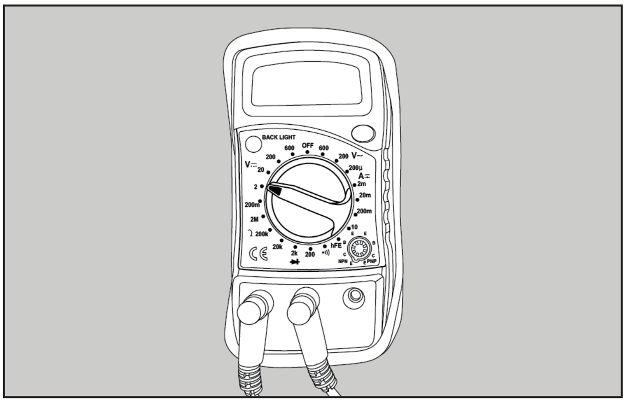
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



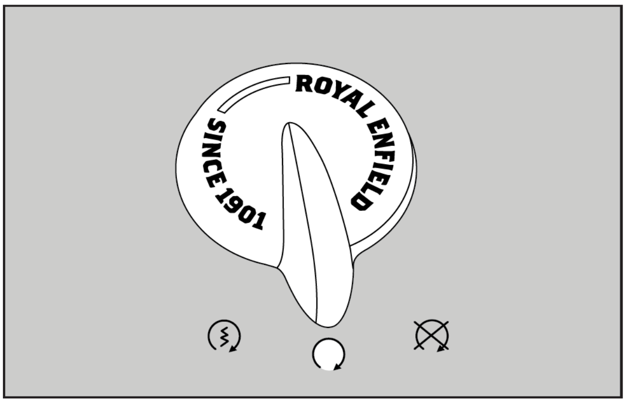
- Switch "OFF" the Engine

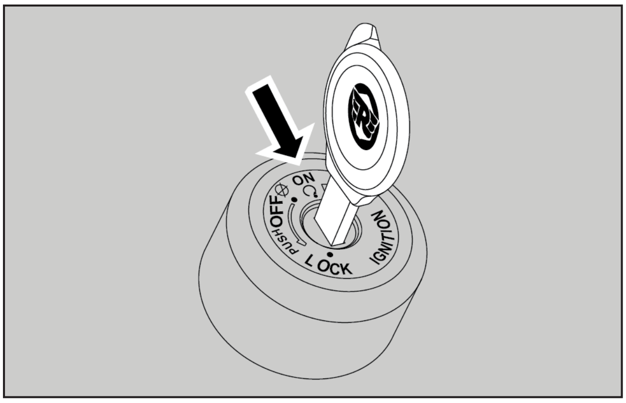
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

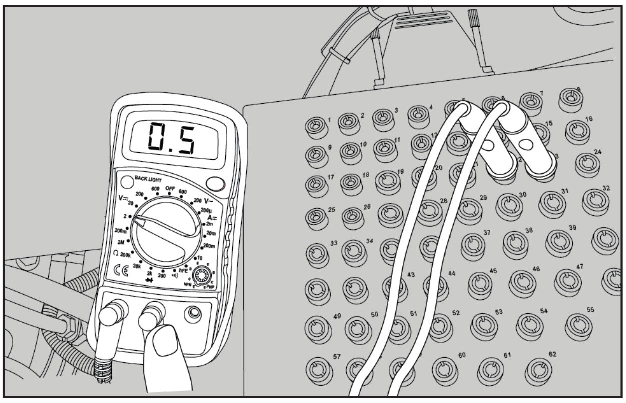


- Turn "ON" the Ignition switch and kill switch





- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU break outbox



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the Heater output voltage is 0V (After 10 sec from engine start) then the issue exists in either Sensor heater or ECU
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), you replace with Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) you have to replace the ECU.

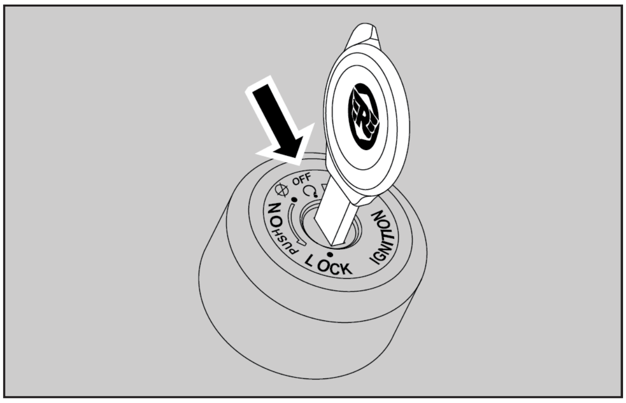
It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

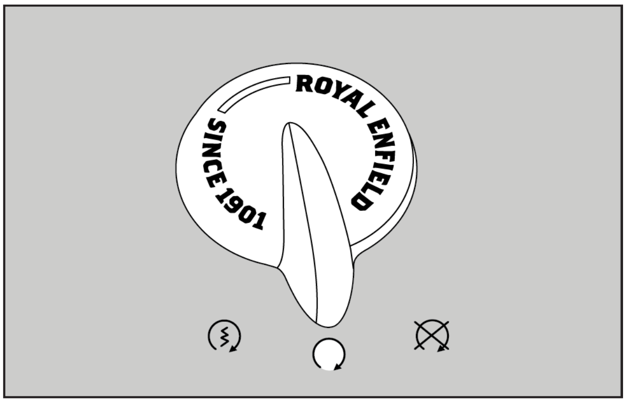
4. DTC Clearing Procedure:

⚠ **CAUTION**

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

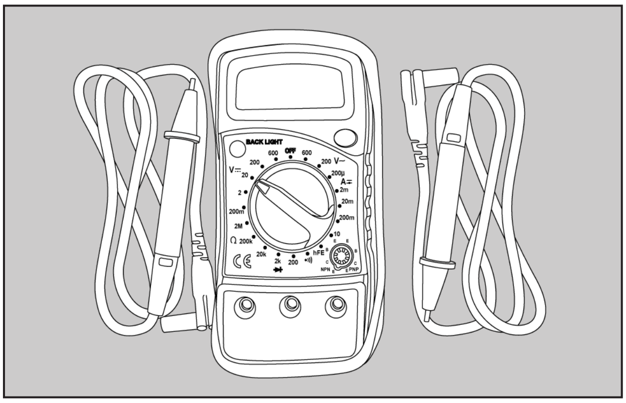
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)



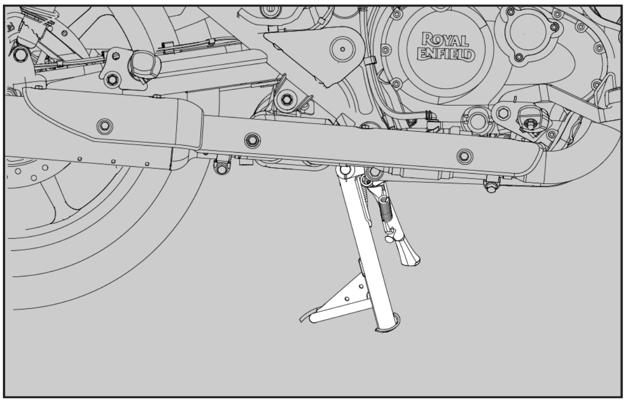
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

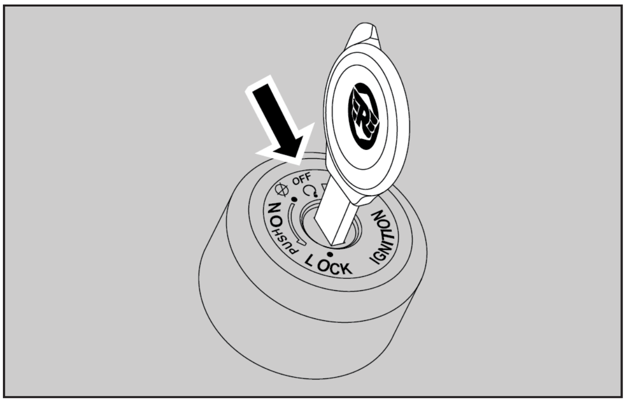
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

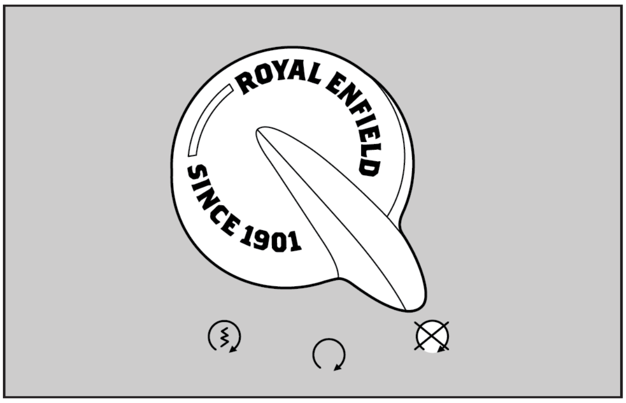
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

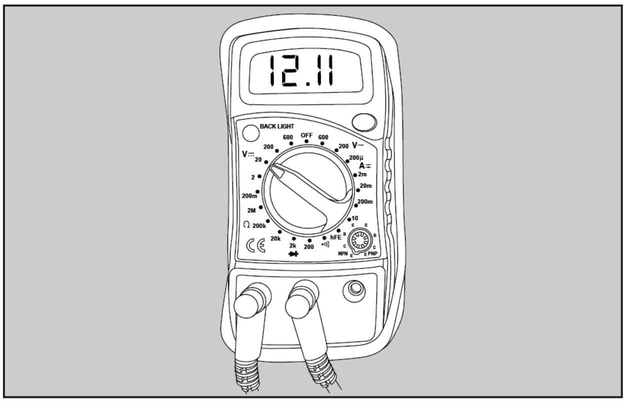


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

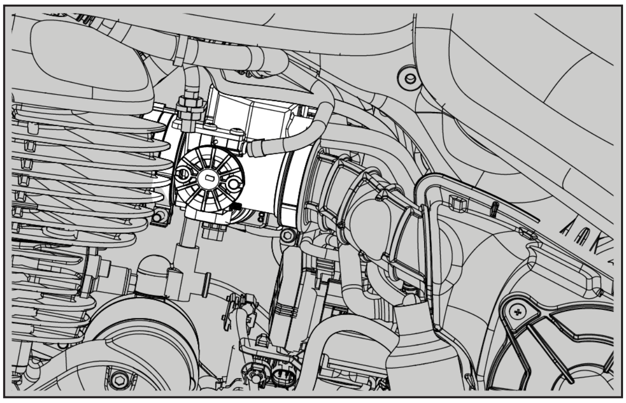
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

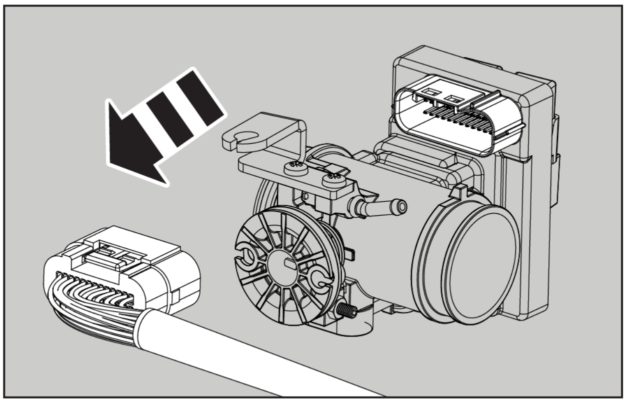
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

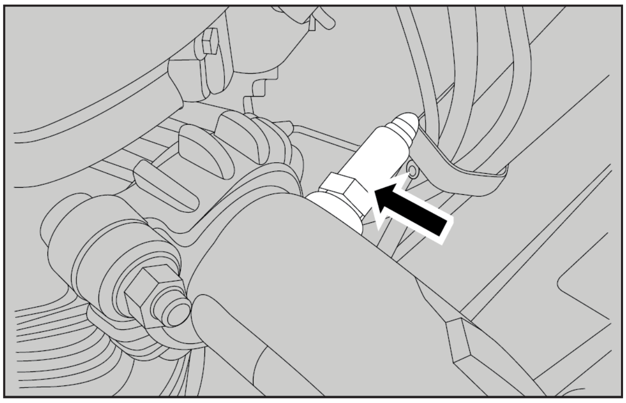
- ECU is located on the Throttle body assembly



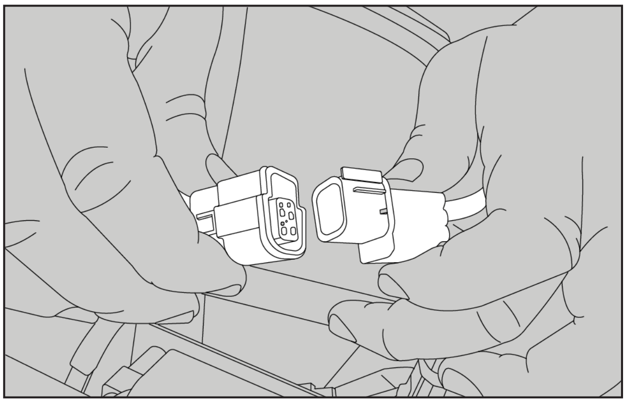
- Disconnect the ECU wiring harness coupler from ECU



- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



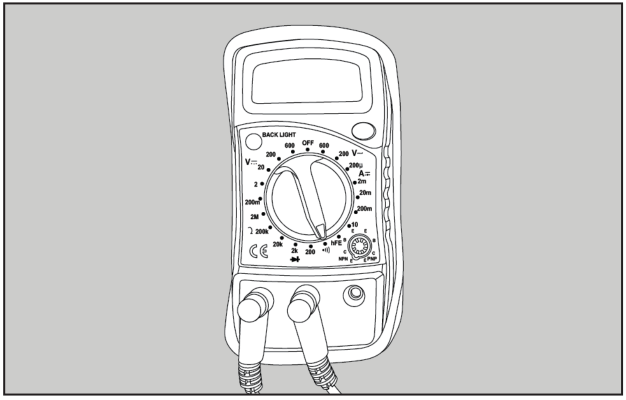
- Disconnect the oxygen sensor coupler.



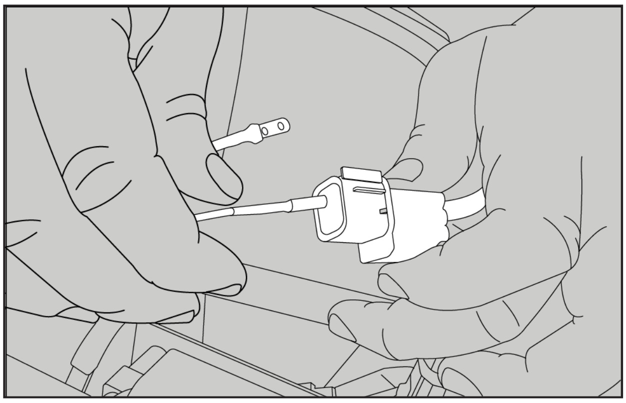
To check Continuity of the Wiring Harness

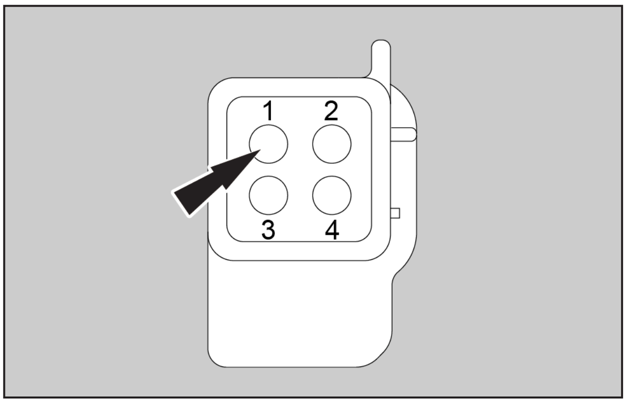
STEP 1:

- Keep the multimeter in continuity mode

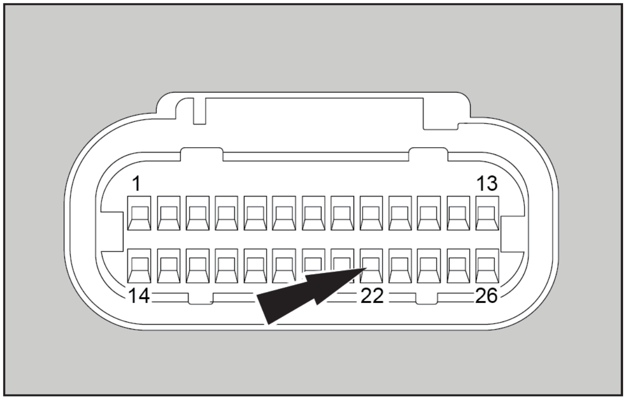


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

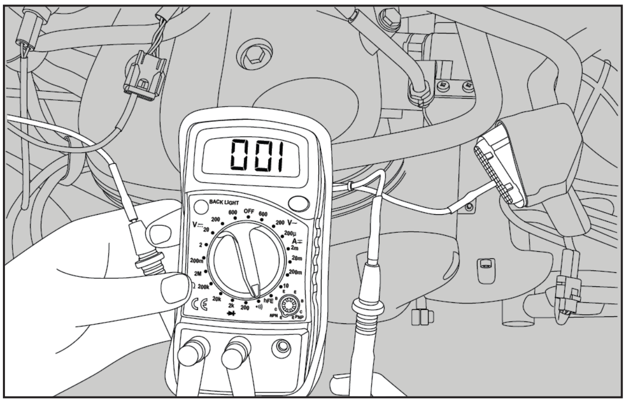




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

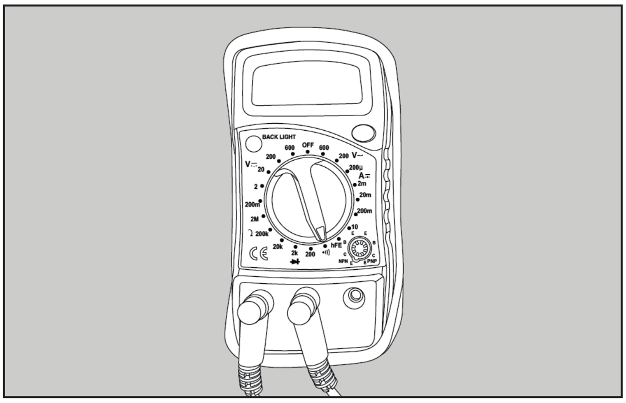


- Check for continuity (Beep Sound from the multimeter)

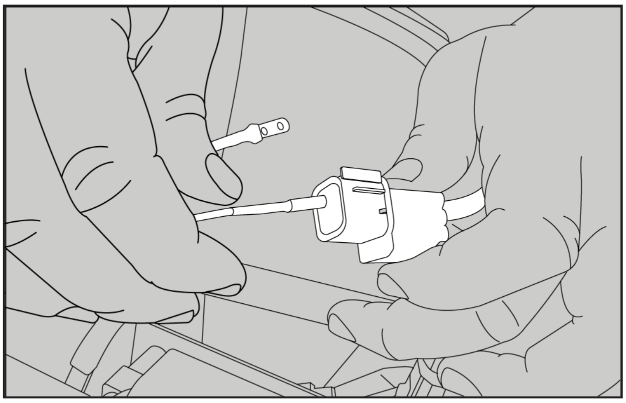


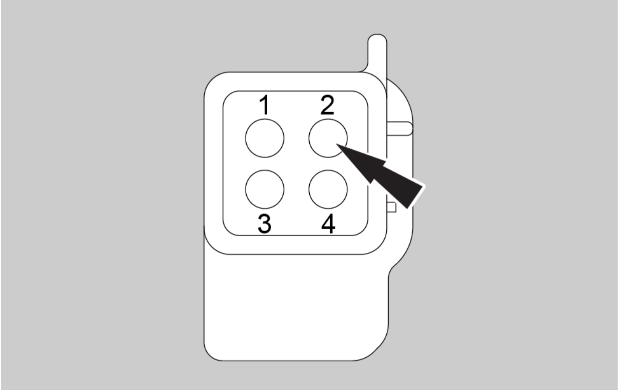
STEP2:

- Keep the multimeter in continuity mode

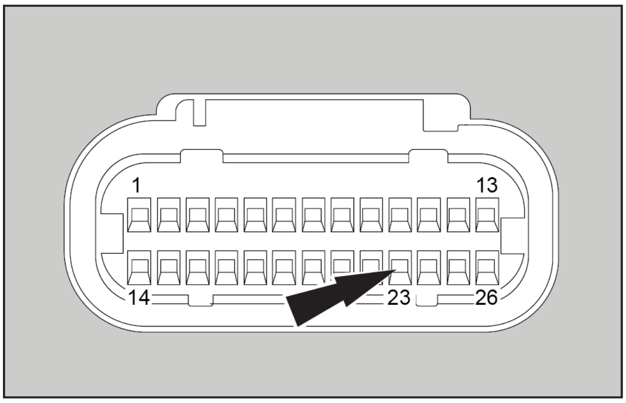


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 3 of the wiring socket.

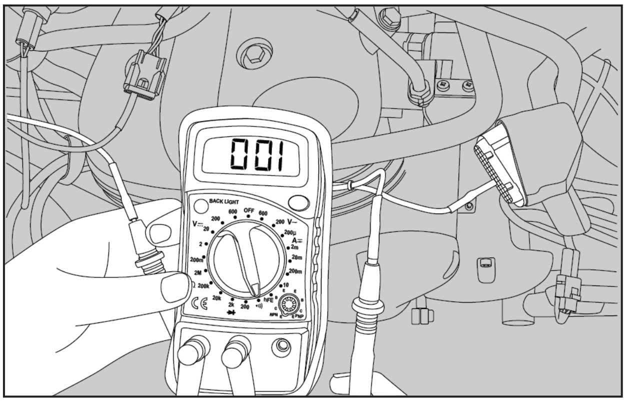




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

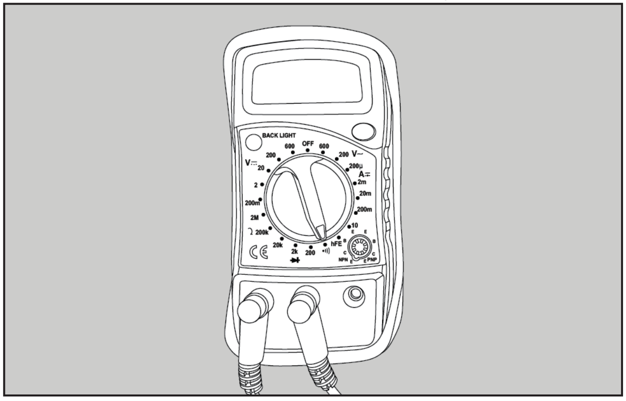


- Check for continuity (Beep Sound) from the multimeter

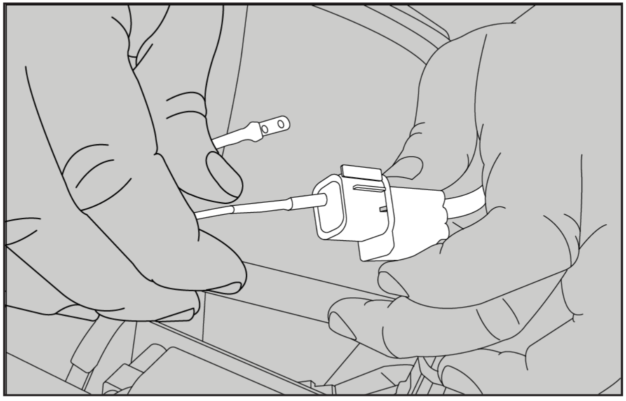


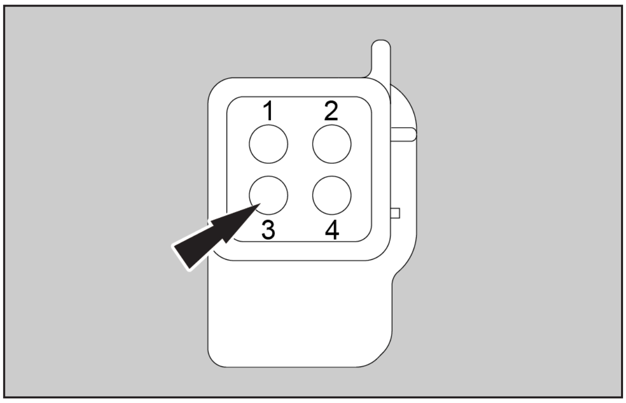
STEP 3:

- Keep the multimeter in continuity mode

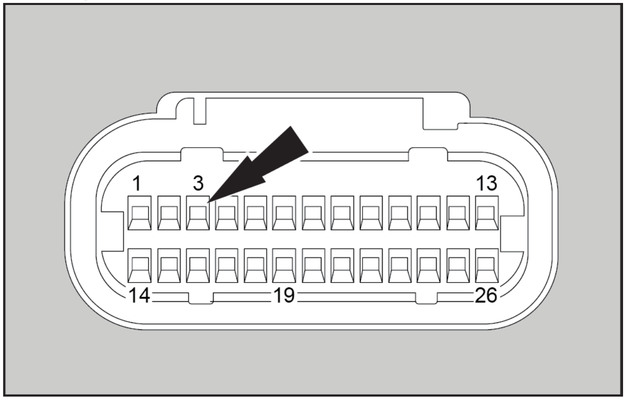


- Connect Test lead wire 60 series (blue color) with the yellow tag to Pin 3 of the wiring socket.

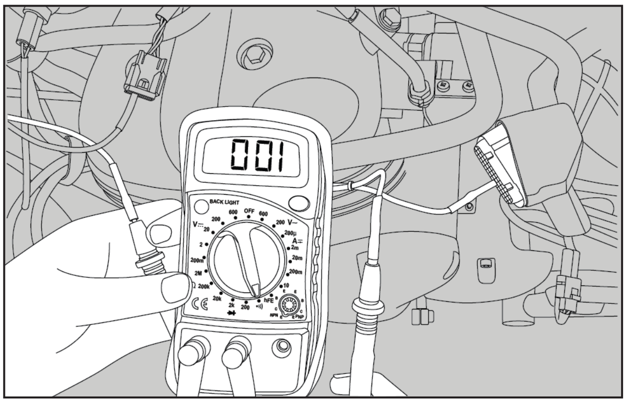




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

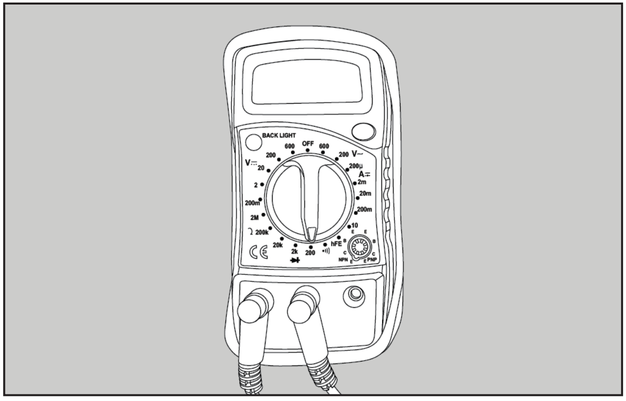


- Check for continuity (Beep Sound) from the multimeter

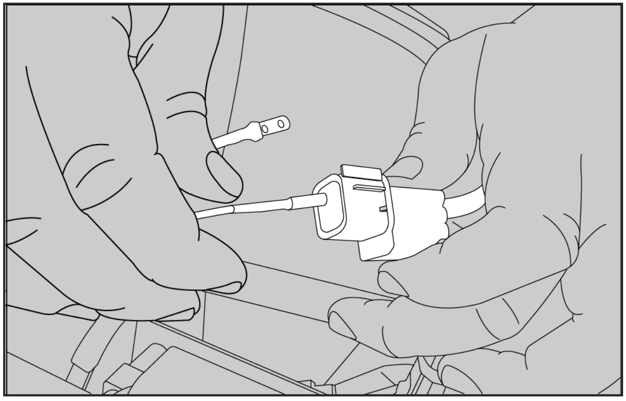


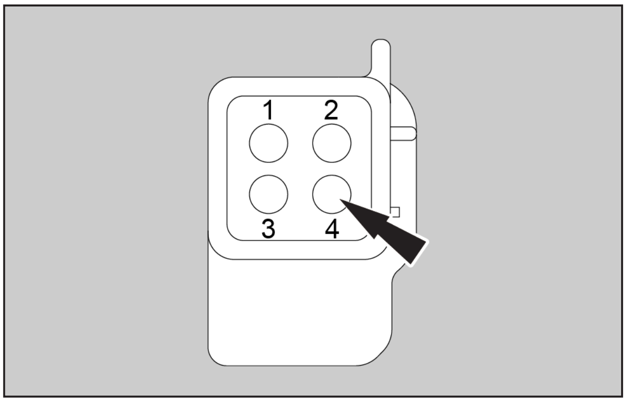
STEP 4:

- Keep the multimeter in continuity mode

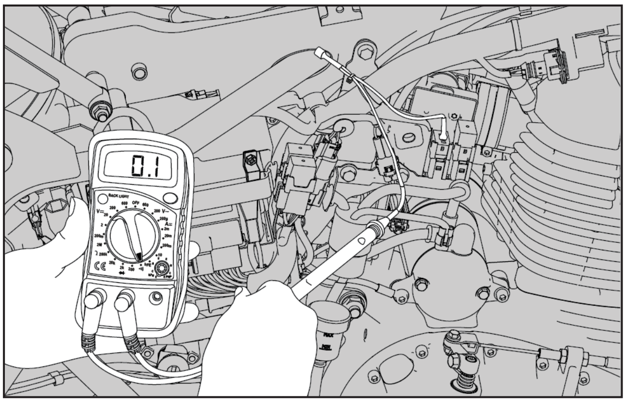


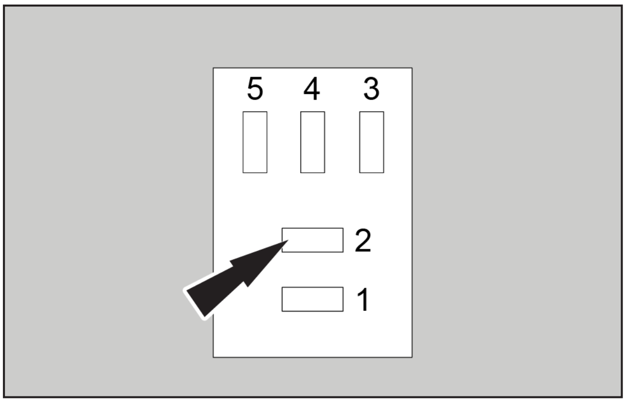
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



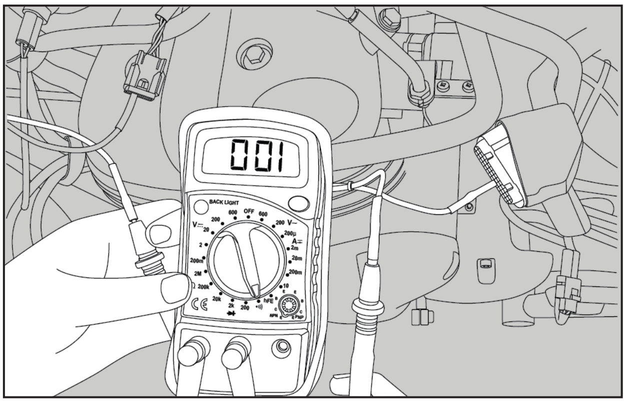


- Disconnect power relay and connect test lead wire into relay socket pin 2.





- Check for continuity (Beep Sound) from the multimeter

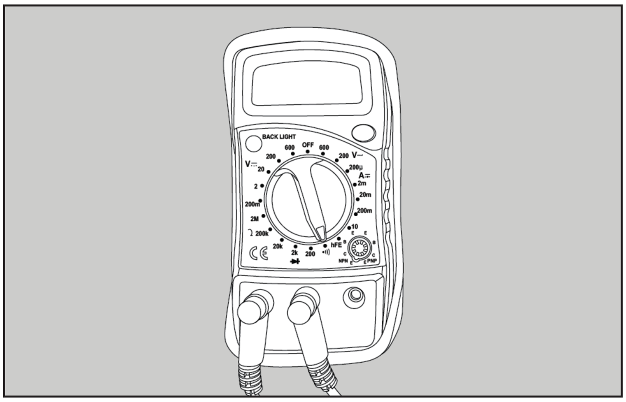


⚠ CAUTION

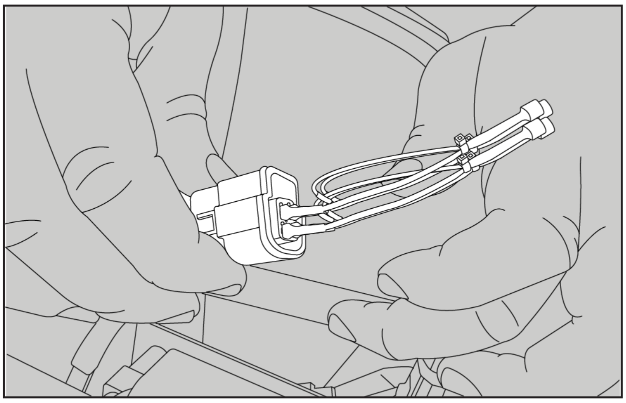
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the resistance of the sensor

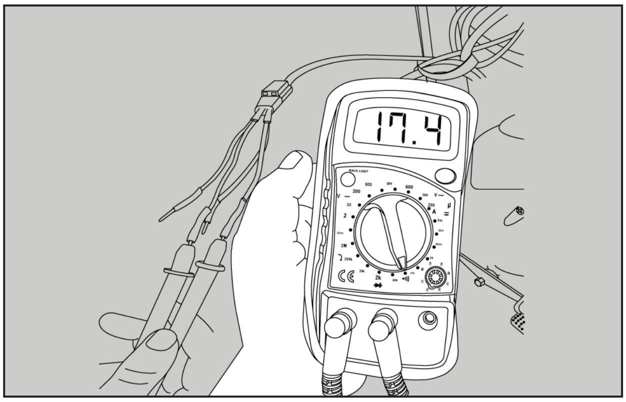
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

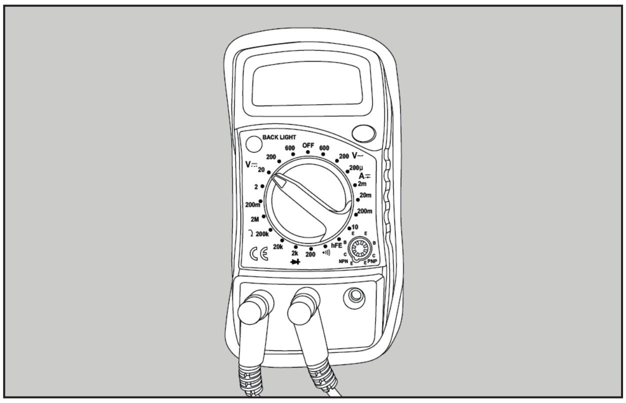


⚠ CAUTION

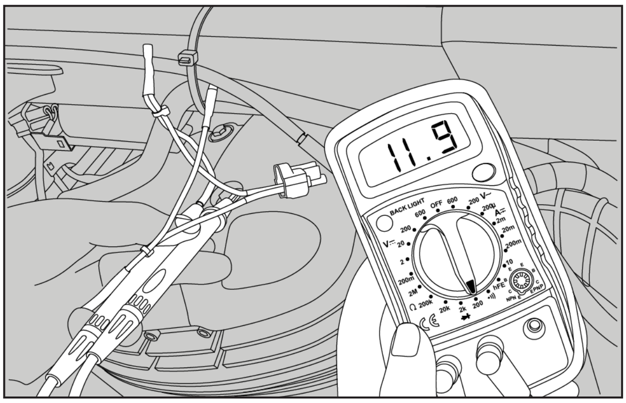
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn “ON” the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)

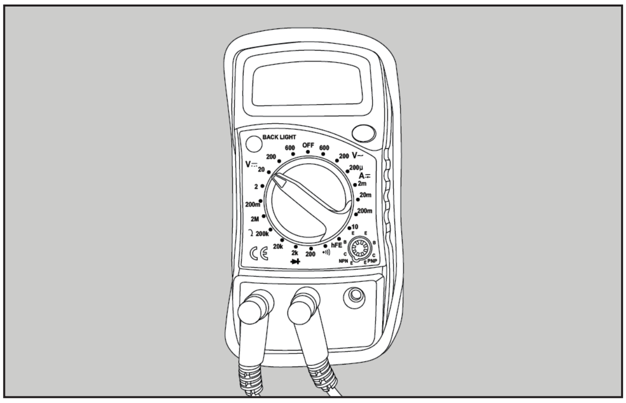


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire (60 series) in the sensor socket.

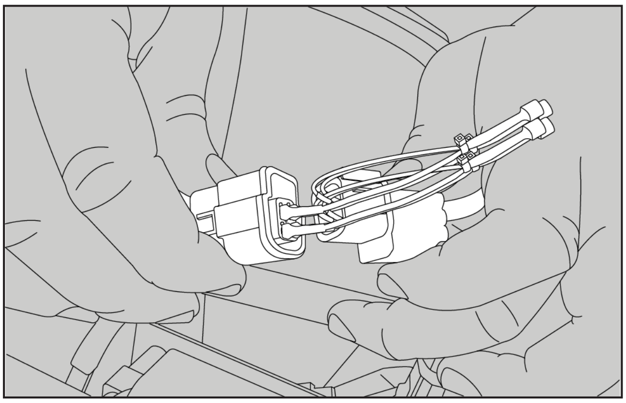
  Pin 1 with 60 series (blue color) test lead wire with black tag

  Pin 2 with 60 series (blue color) test lead wire with red tag

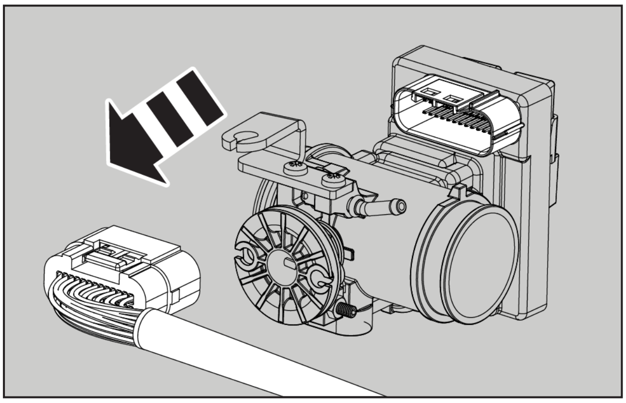
  Pin 3 with 60 series (blue color) test lead wire with Yellow tag

  Pin 4 with 60 series (blue color) test lead wire green tag

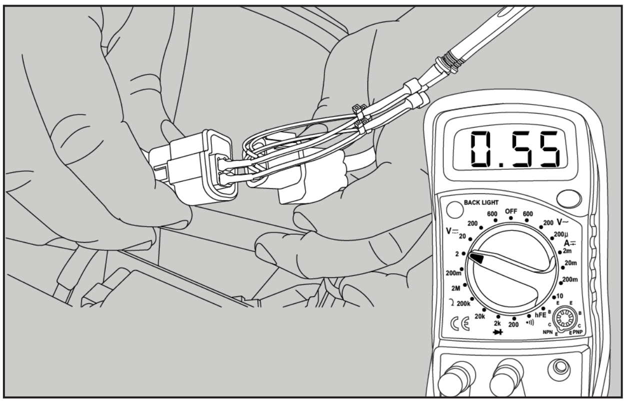
And the connect the other end of the test lead wire in the sensor wiring harness



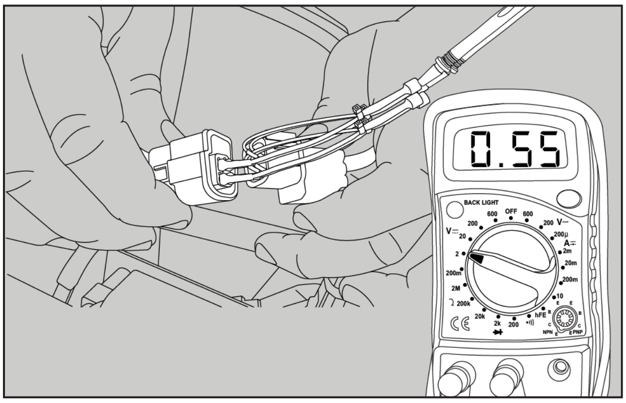
- Connect the ECU coupler to ECU



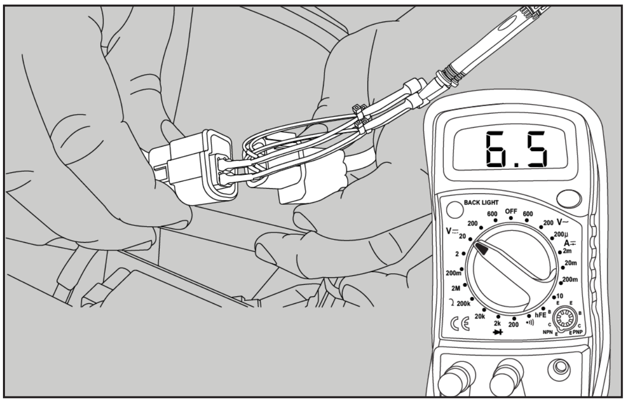
- Start the vehicle and keep the vehicle in Idling RPM
- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be between 0.4 V to 0.65 V



- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and Negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be from 0.1 V to 0.8 V. (After 45 Seconds)



- Place the positive probe in pin 4 (60 series blue color) test lead wire with green tag and negative probe in Pin 3 (60 series blue color test lead wire with yellow tag) . During idle rpm the voltage between the pins should be less than 8V



d. Decision Point:

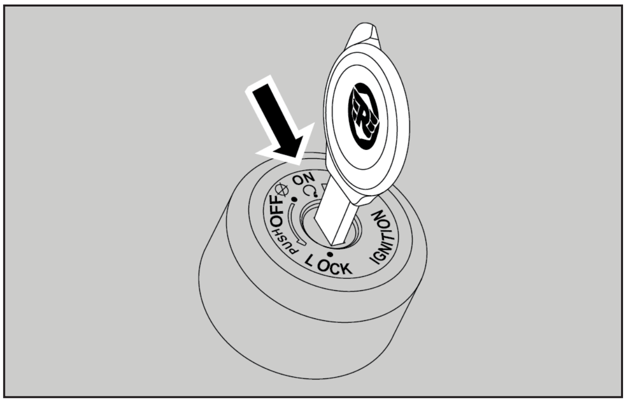
- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), and Sensor voltage not varying from <0.3V to >0.7 V (After 45 sec from engine start) you have to replace the Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) and Sensor voltage not within the specified limit (0.4 V to 0.65 V - Ignition ON and Kill ON condition) you have to replace the ECU.

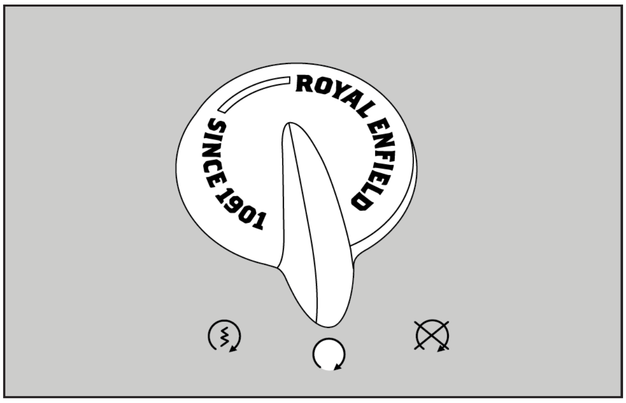
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0171 - LAMBDA SENSOR HEATER

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0171	Lambda Sensor Signal	Fuel System - Running Too Lean

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P0171

Type of error : Oxygen Sensor Heater Control Circuit Low / Open

(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

b.Preliminary Checks (Basic Check Points):

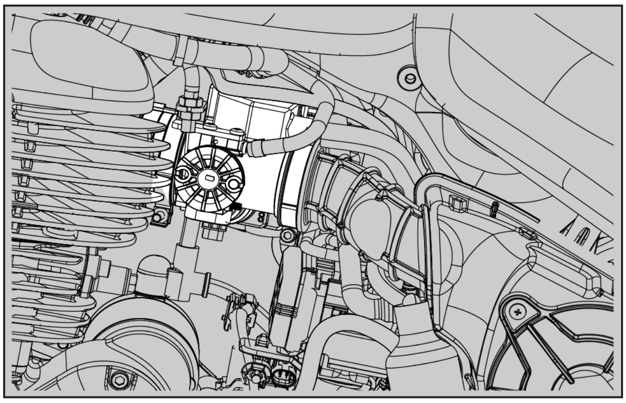
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

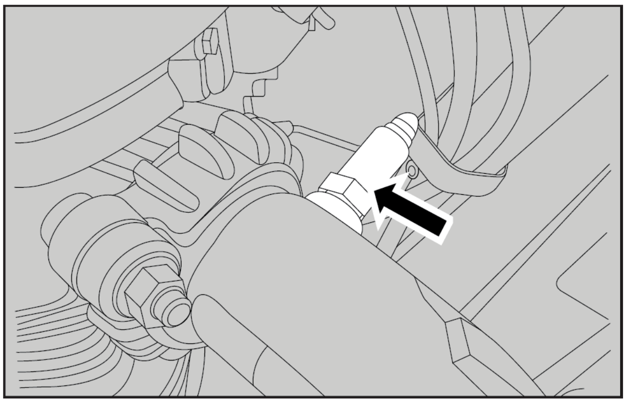
⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

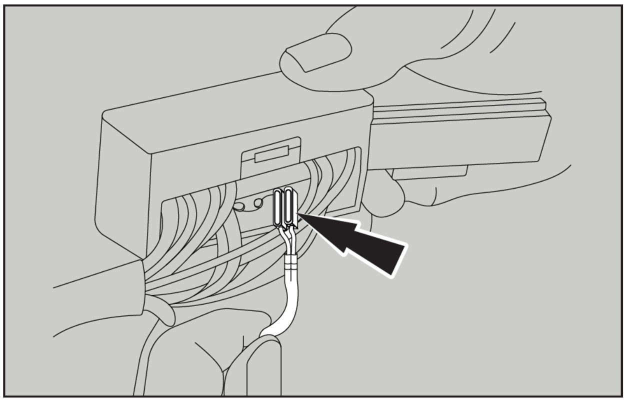
- ECU is located on the throttle body assembly



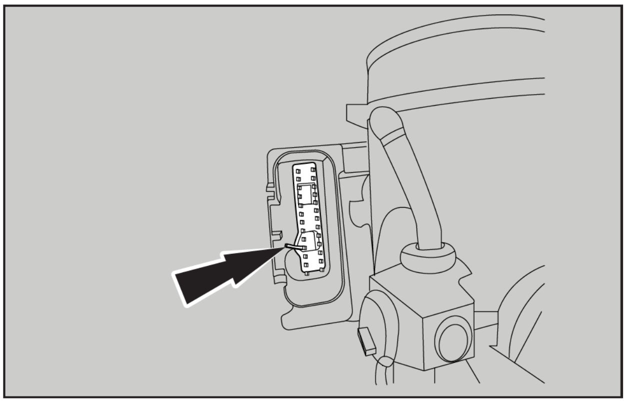
- The lambda sensor is located on the Exhaust pipe



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

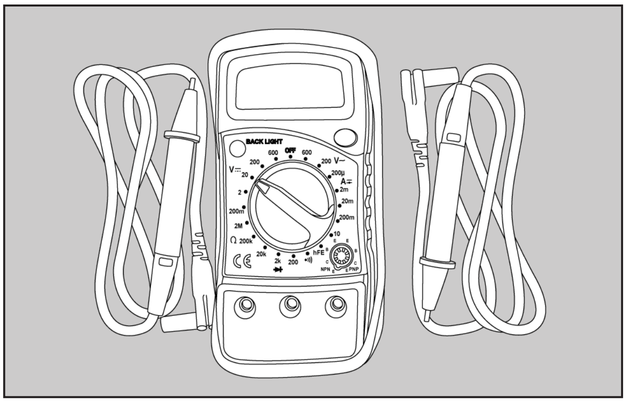
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

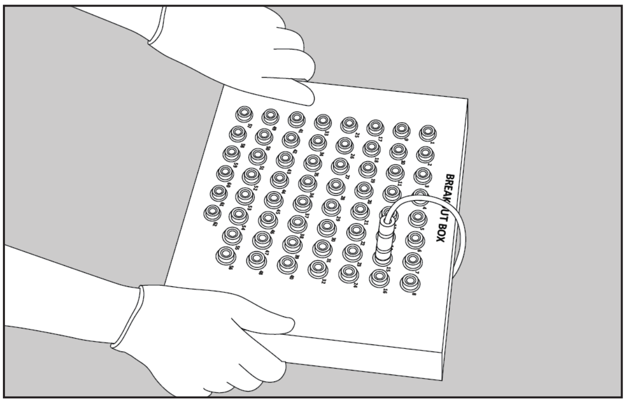
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

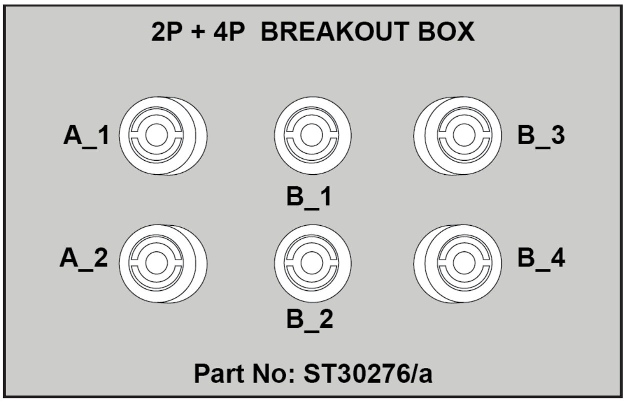
- **Tools Required**
- Multimeter (Universal)



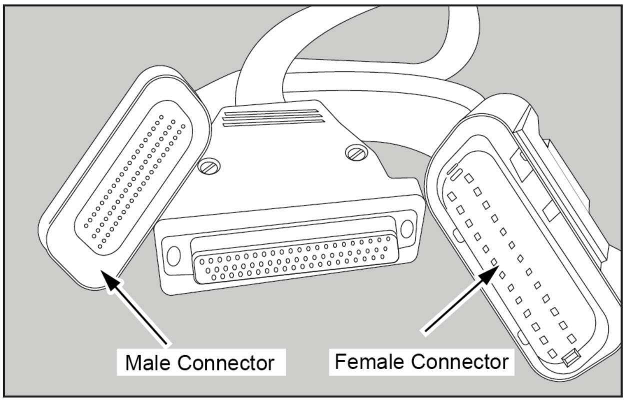
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

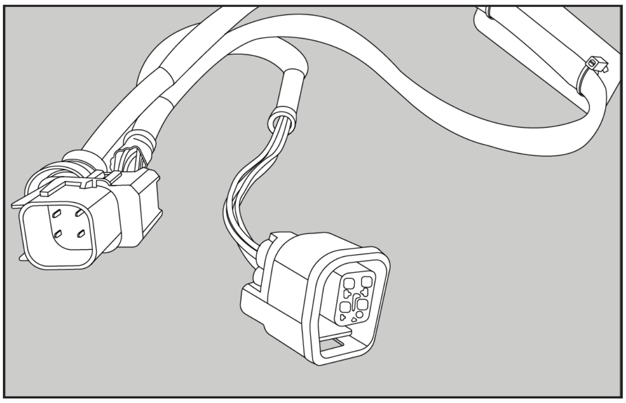
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

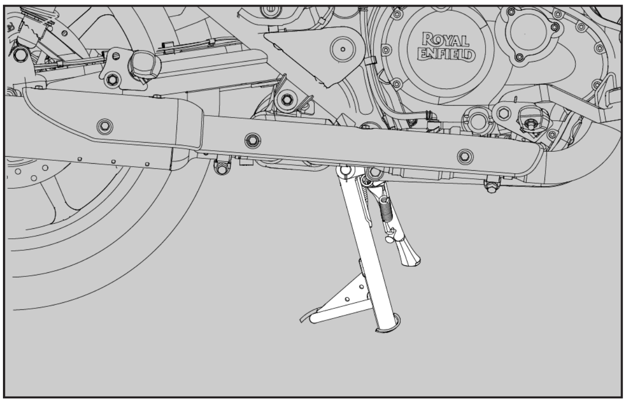

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

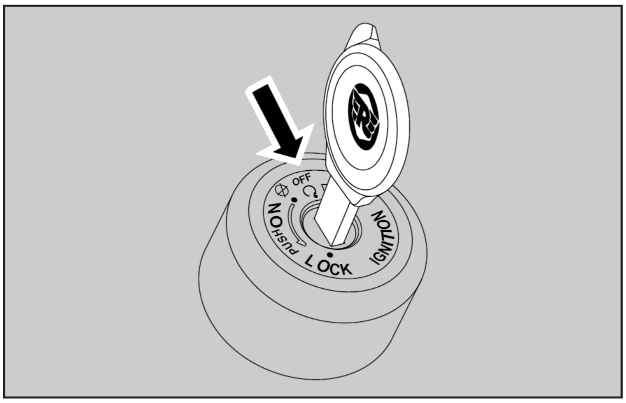


b. Pre-Checks:

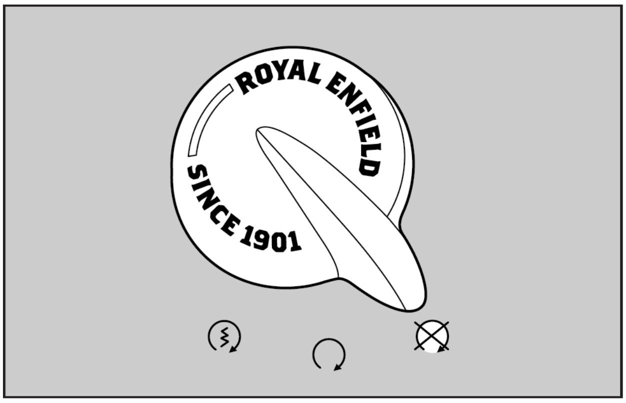
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

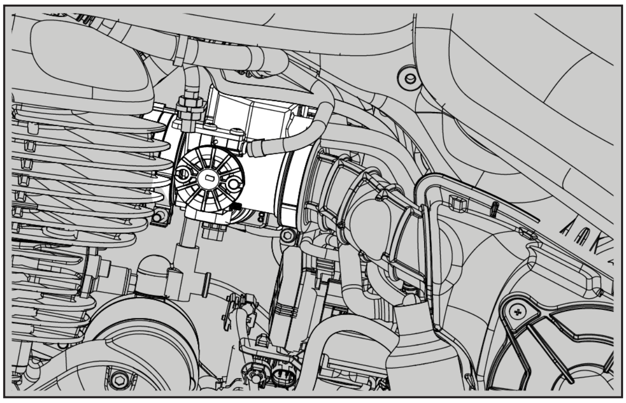
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

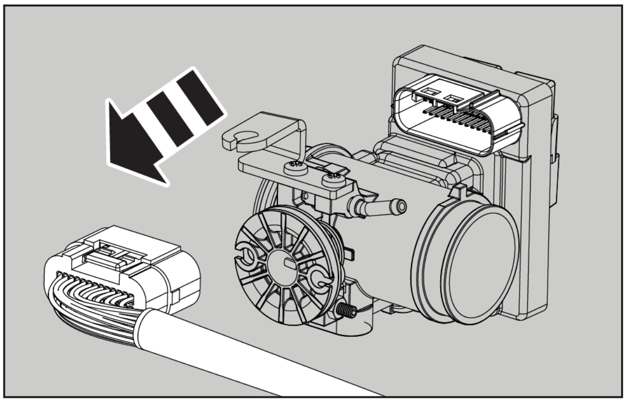
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

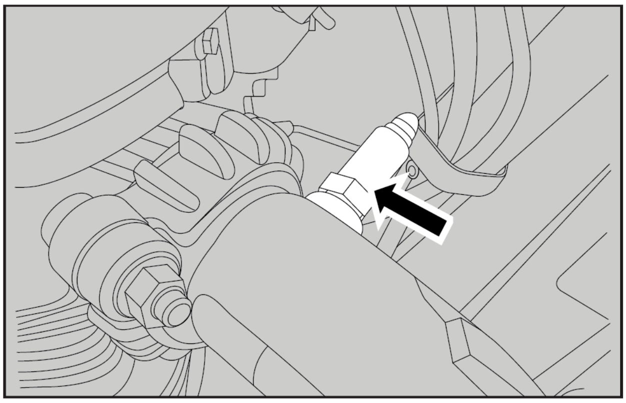
- ECU is located in the throttle body assembly



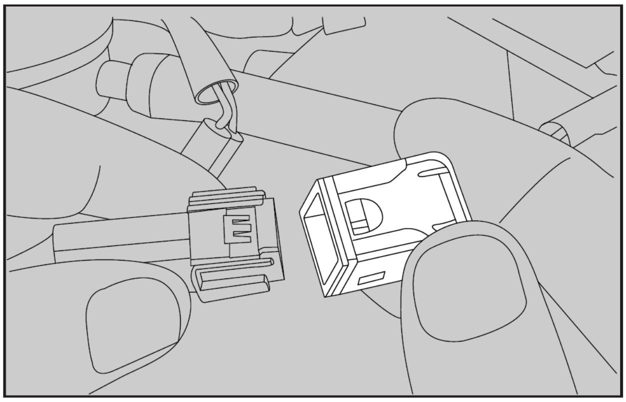
- Disconnect ECU coupler from ECU.



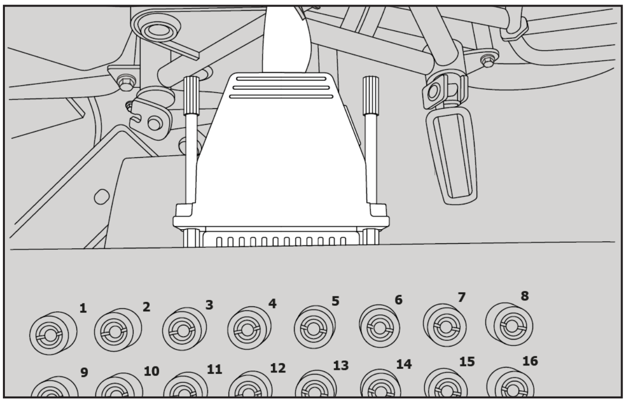
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.



- Connect ECU Breakout box to ECU breakout box harness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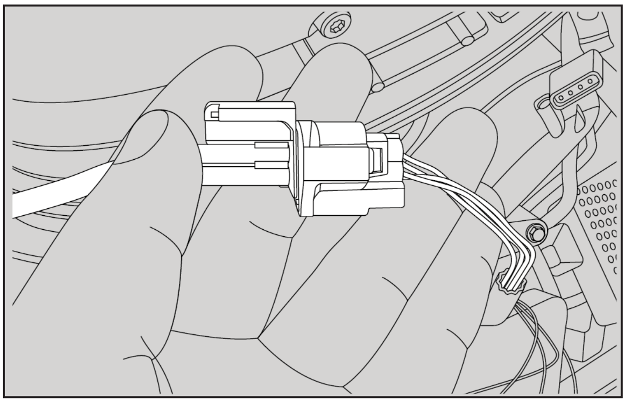
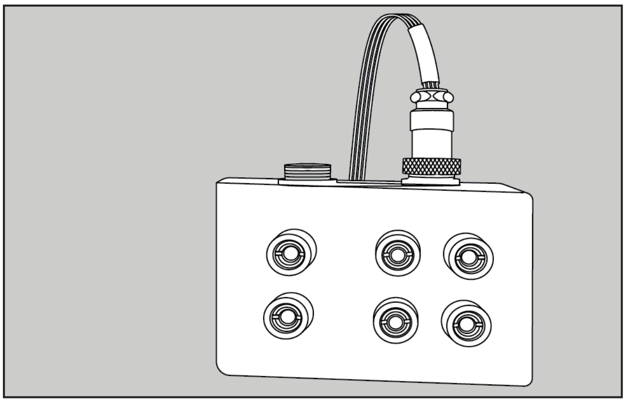
16

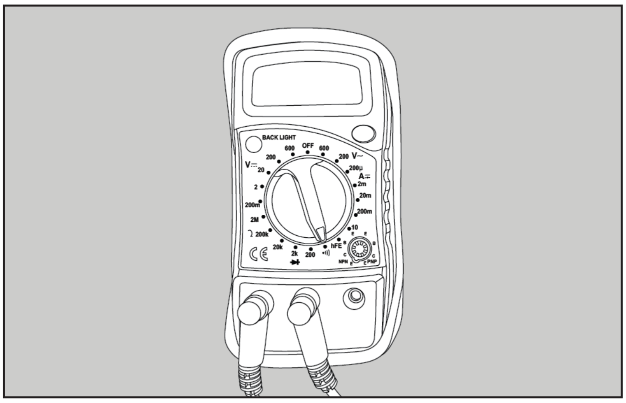
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



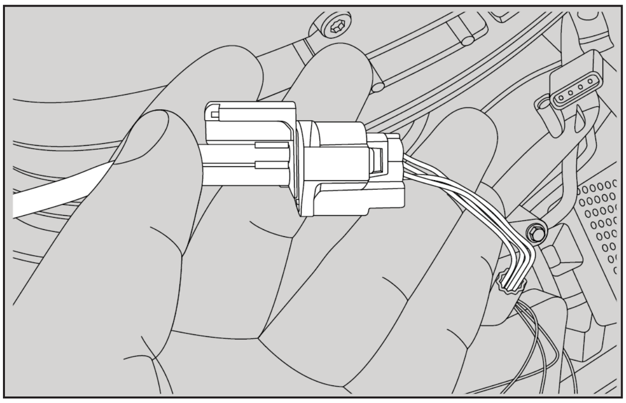


a. To check Continuity of Wiring harness

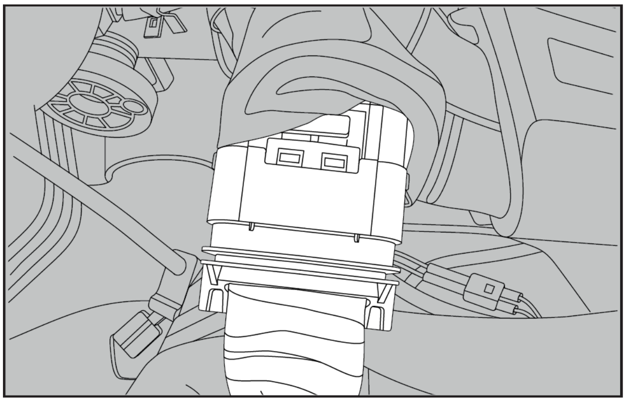
- Keep the multimeter in continuity mode


BACK LIGHT
600
OFF
600
200
V~
200
V⎓
20
200µ
A⎓
2
2m
200m
20m
2M
200m
200k
10
20k
2k
200
hFE
NPN
PNP
B
C
E

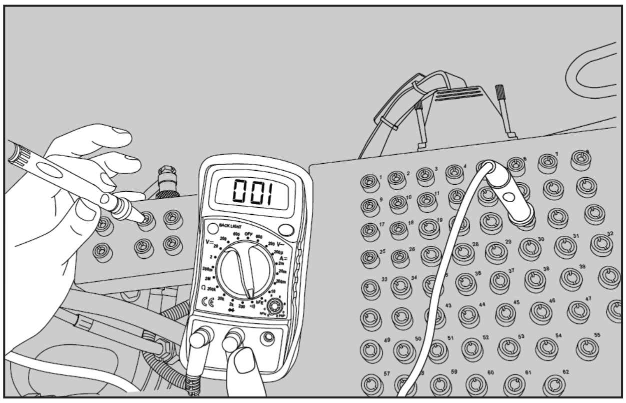
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



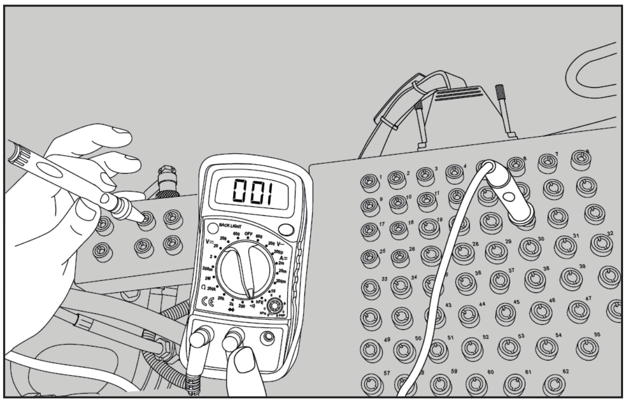
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



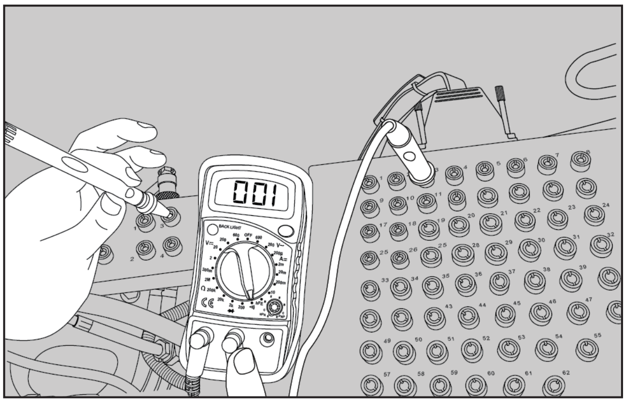
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



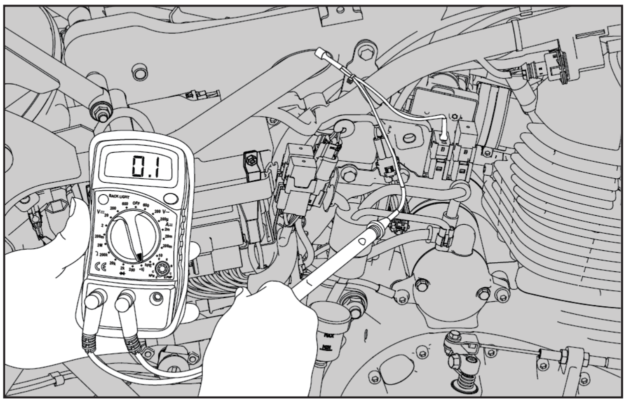
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

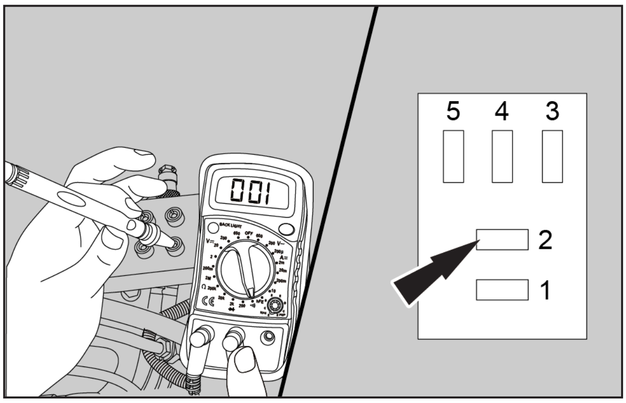


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



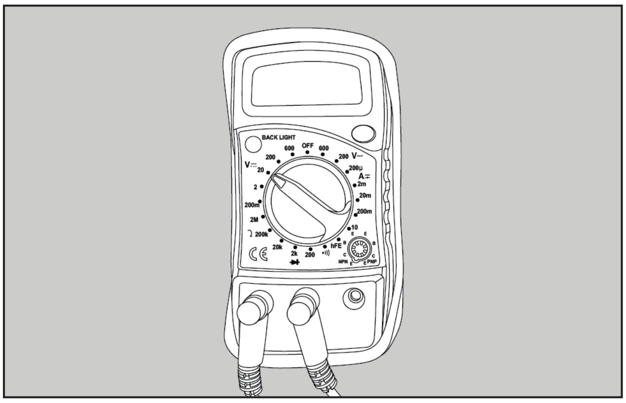
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



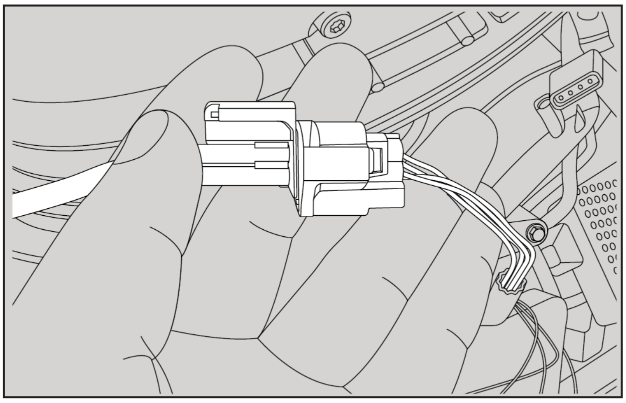


C. To check output voltage

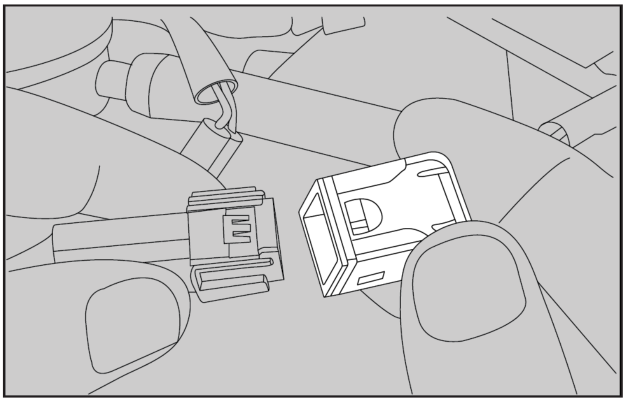
- Keep the multimeter in voltage mode (20V)



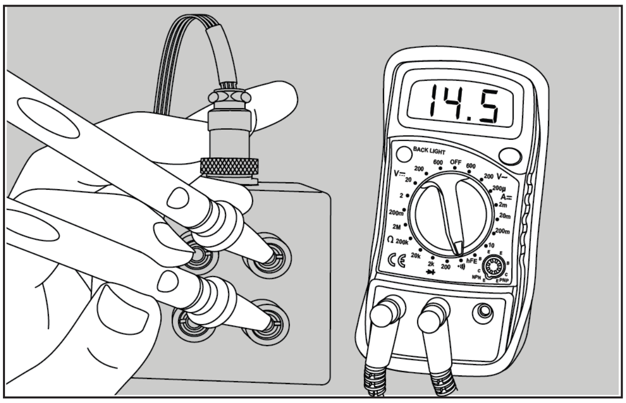
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

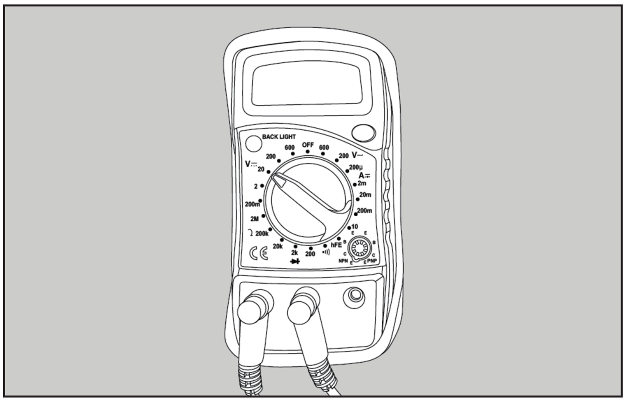


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

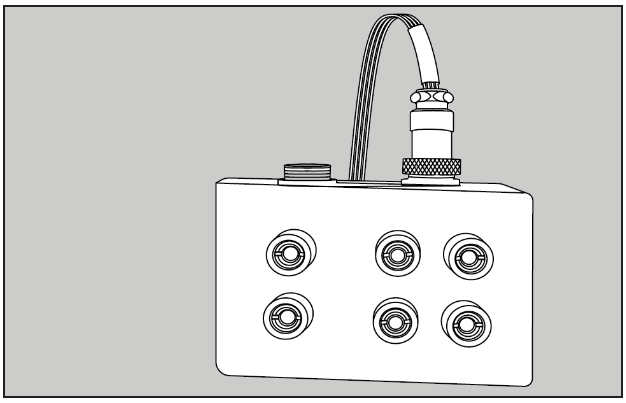


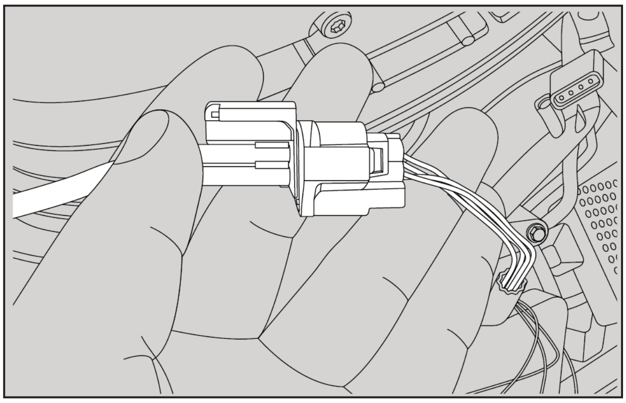
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

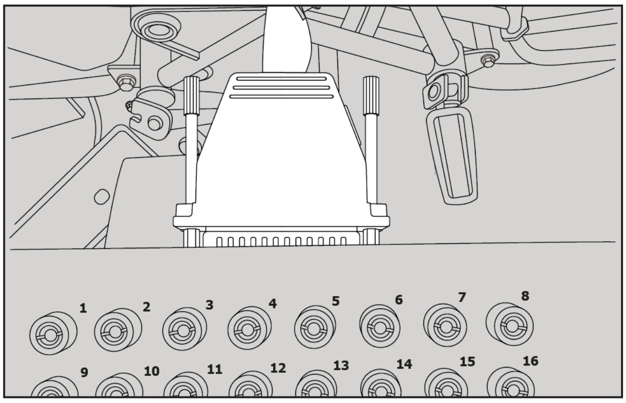


- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler





- Similarly, connect the ECU breakout box to ECU and wiring harness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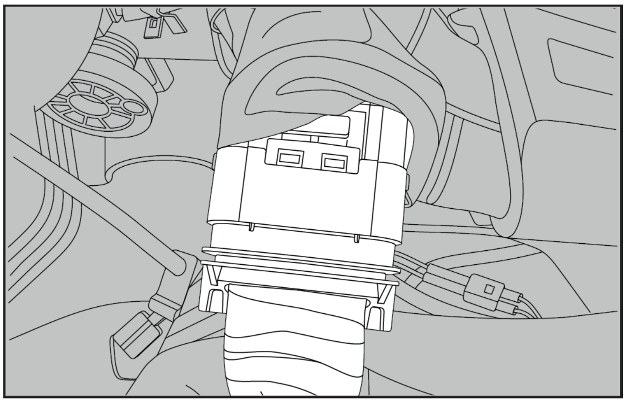
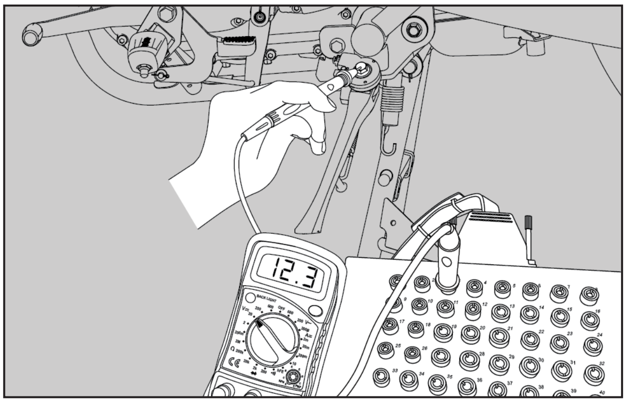
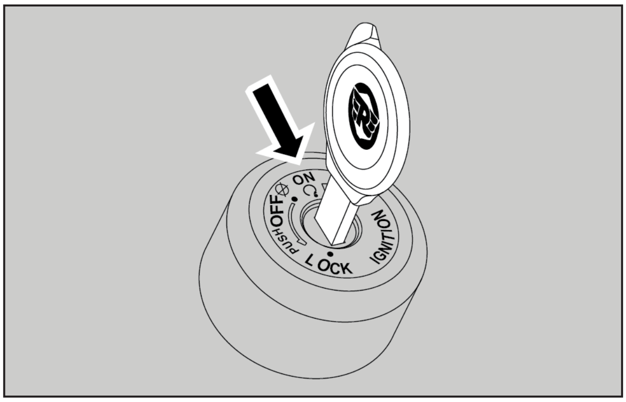
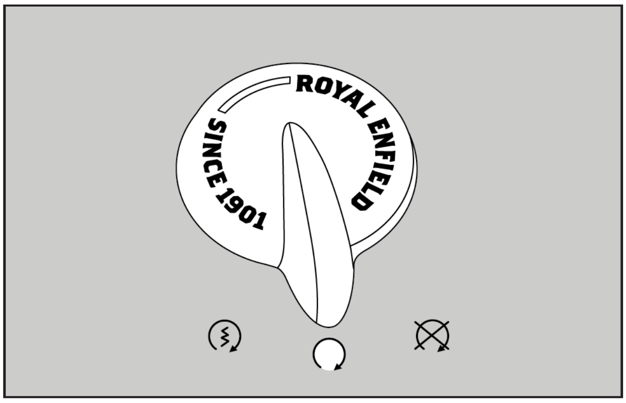


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

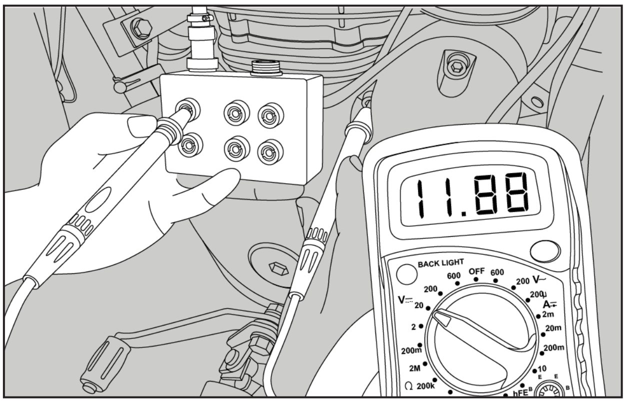


- Turn "ON" the ignition and kill switch


ON
PUSH OFF
LOCK
IGNITION

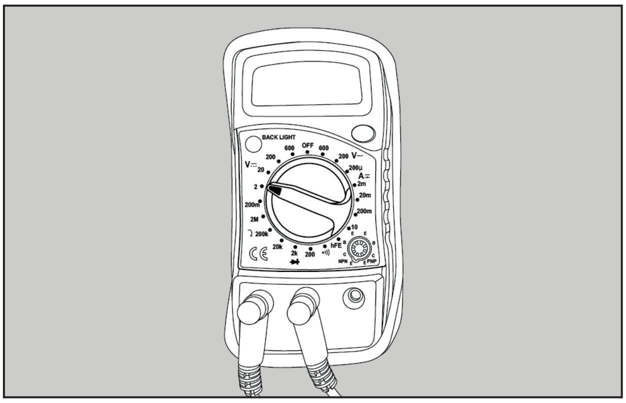

ROYAL ENFIELD
SINCE 1901

- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

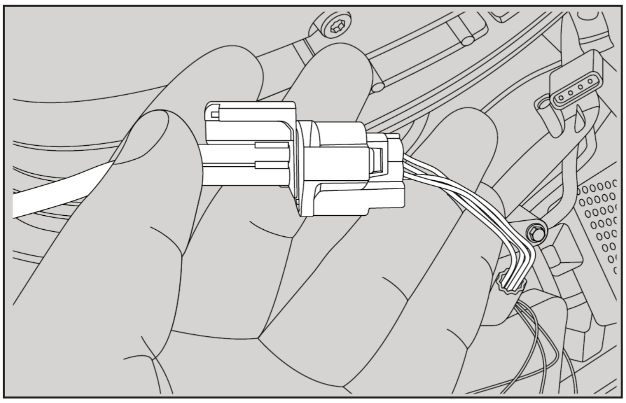

11.88
BACK LIGHT

To Check output voltage check

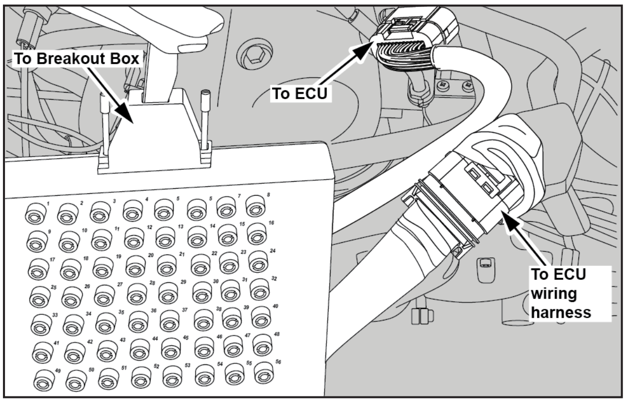
- Keep the multimeter in Voltage mode (2 V).



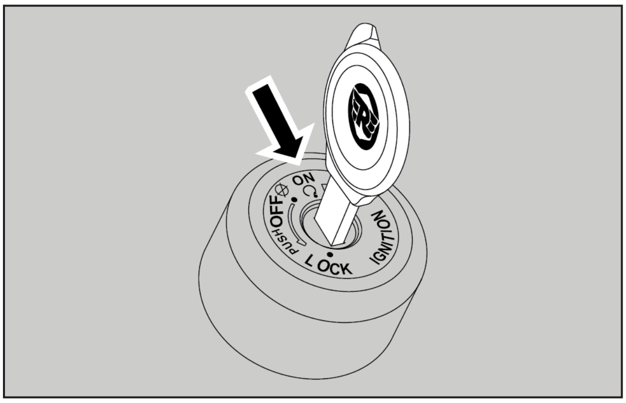
- Connect the female end of the Sensor breakout harness into the sensor coupler

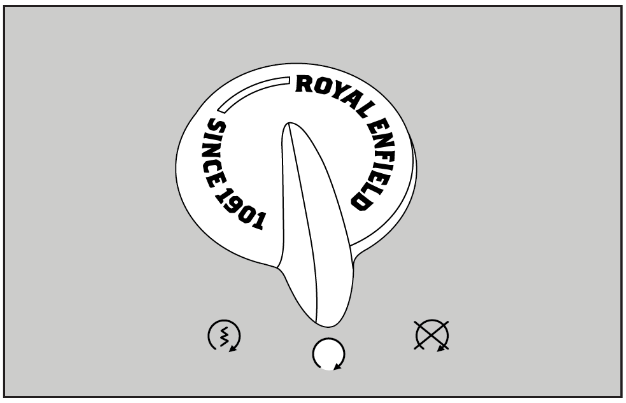


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn "ON" the kill switch and ignition switch

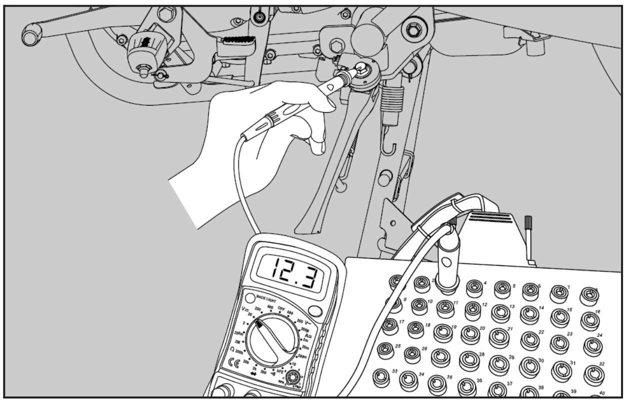

ON
OFF
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

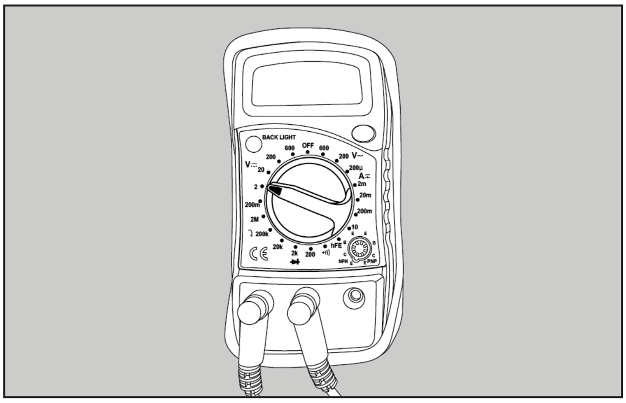
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



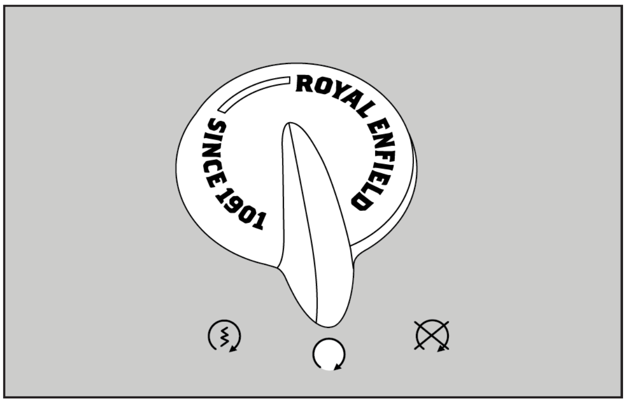
- Switch "OFF" the Engine

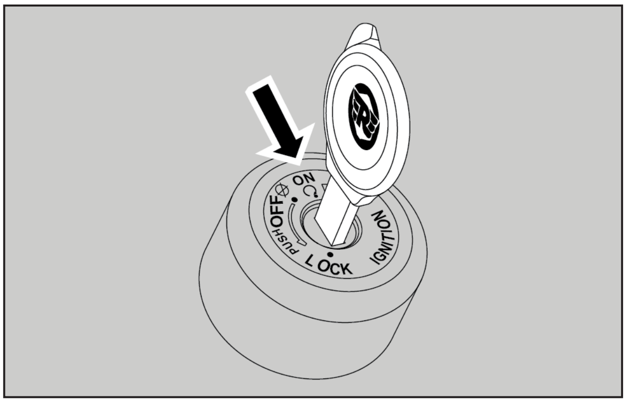
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

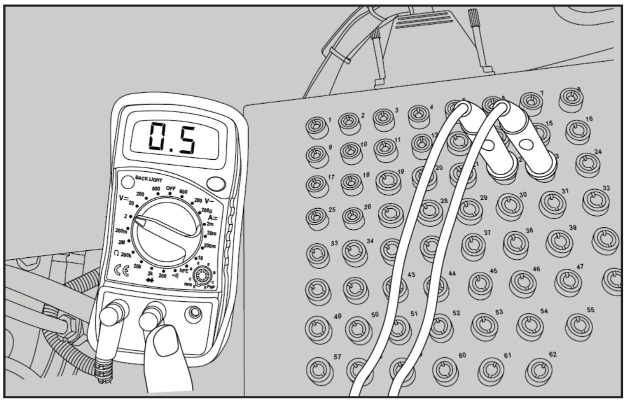


- Turn "ON" the Ignition switch and kill switch





- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU break outbox



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

To check the spark plug

- Remove the spark plug and check the tip gap. The gap is to be between 0.7-0.8 mm. Adjust if required
- Inspect the spark plug for carbon deposits. Clean if required. Replace spark plug if necessary

To check the Ignition coil

- Check connection between ignition coil and HT lead.
- Check HT cable for damages and cuts. Replace if damaged.

To check the Fuel pump and injector

- Check fuel hose from fuel pump to injector for leaks or kinks.
- Check proper functioning of injector
- Check fuel flow delivery (190ml for 3 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), and Sensor voltage not varying from <0.3V to >0.7 V (After 45 sec from engine start) you have to replace the Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) and Sensor voltage not within the specified limit (0.4 V to 0.65 V - Ignition ON and Kill ON condition) you have to replace the ECU
- If spark plug is not under specification Please change the spark plug
- If ignition coil is defective or out of specification please change the Ignition coil
- If Injector flow rate is not as per specification Please replace the injector
- If fuel pump flow rate is not as per specification Please replace the Fuel pump

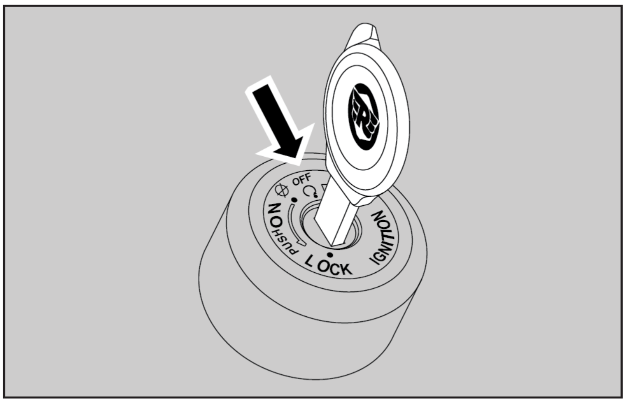
It is recommended to replace Lambda or Oxygen Sensor/ Wiring harness / ECU / Spark Plug / Ignition Coil / Injector / Fuel Pump as per the advice from Royal Enfield only.

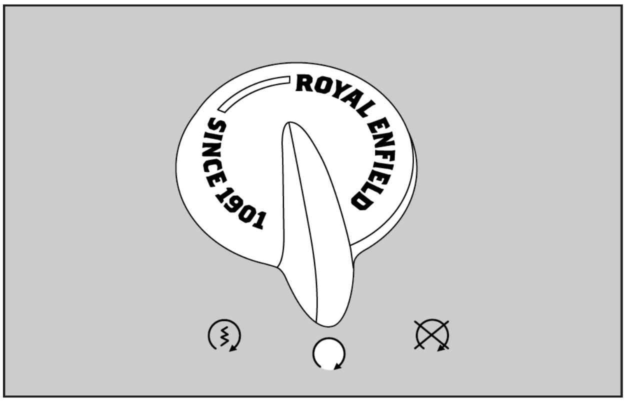
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

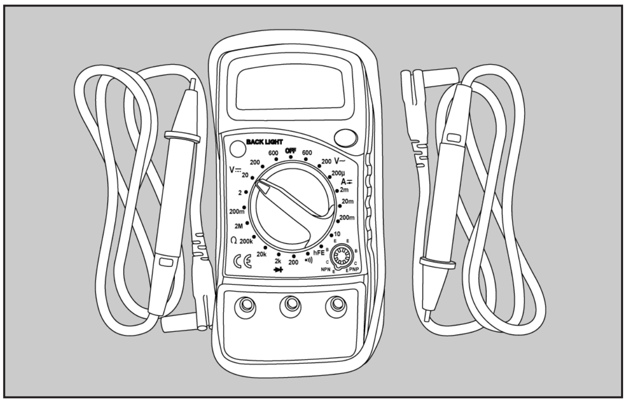
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)



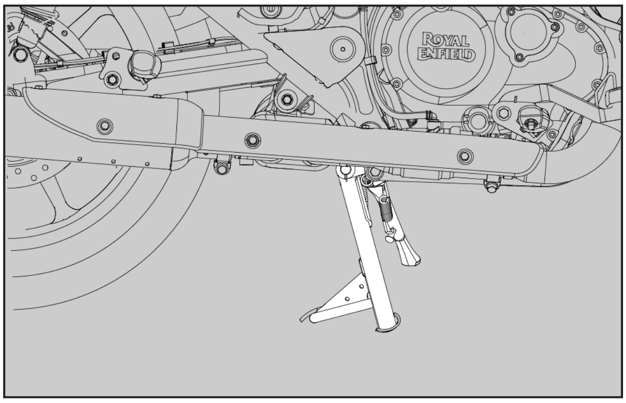
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

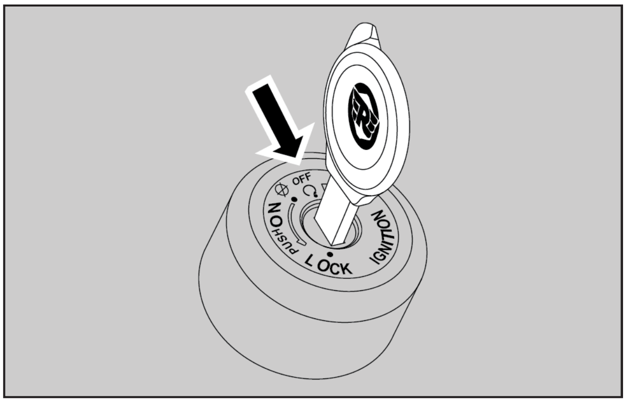
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

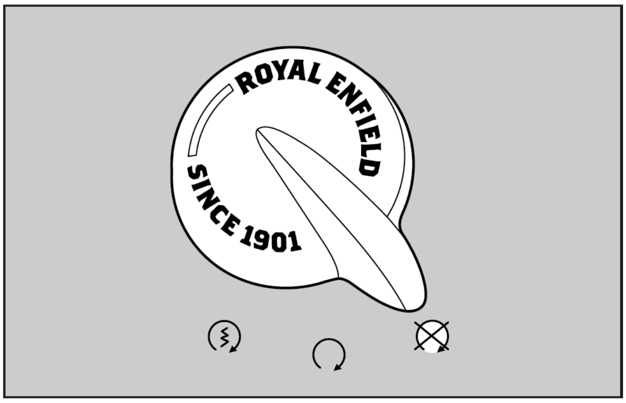
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

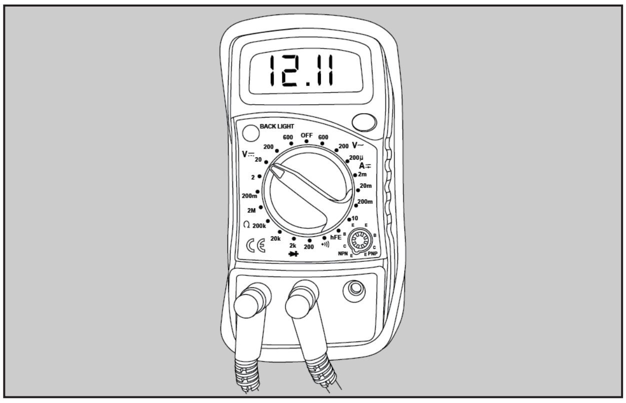


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

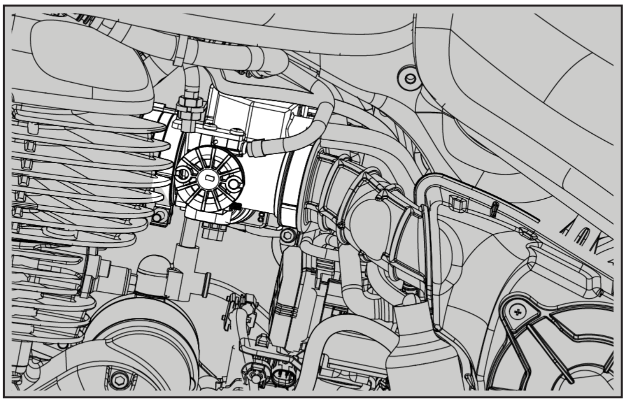
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/oxygen sensor coupler*

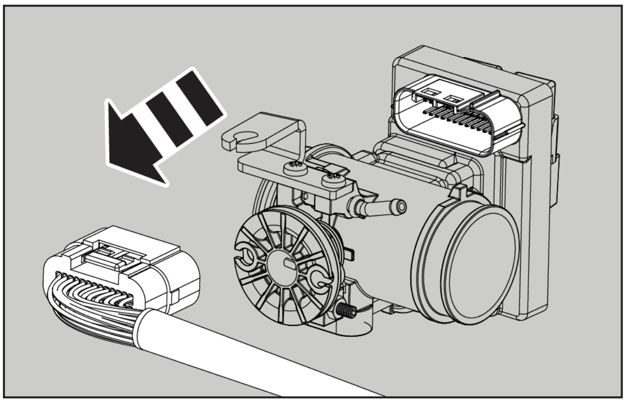
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

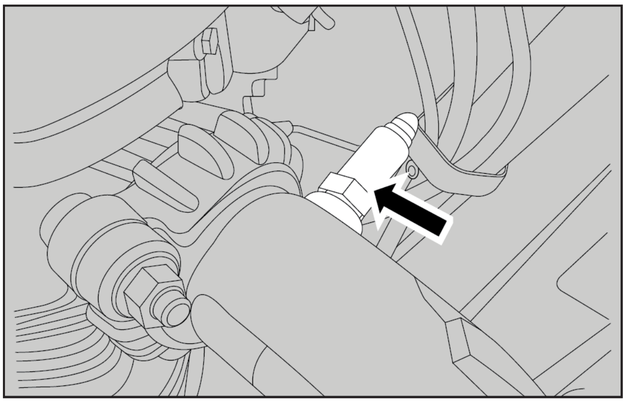
- ECU is located on the Throttle body assembly



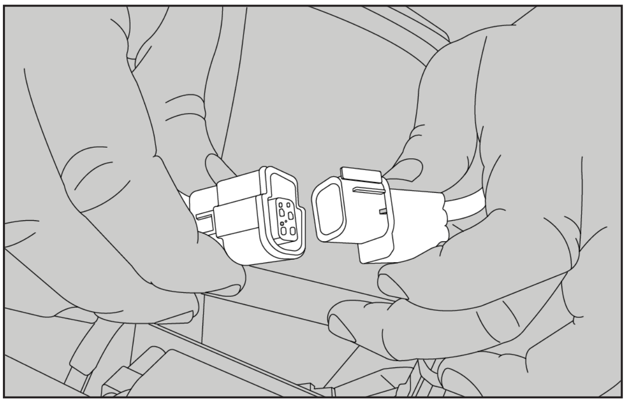
- Disconnect the ECU wiring harness coupler from ECU



- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



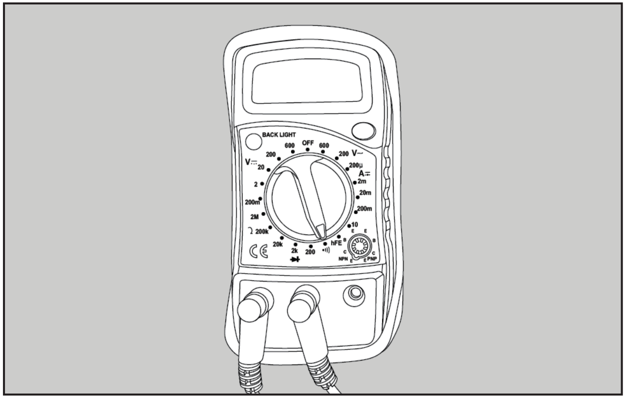
- Disconnect the oxygen sensor coupler.



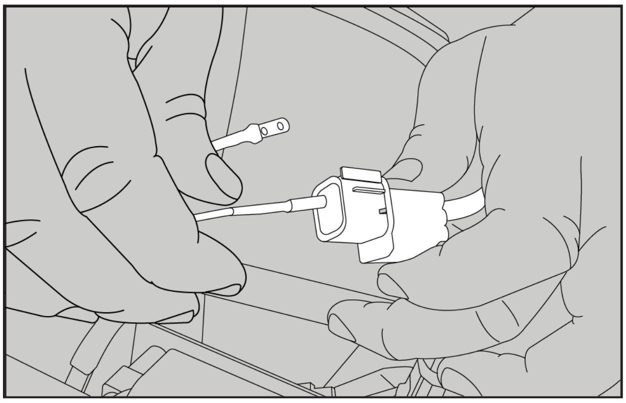
To check Continuity of the Wiring Harness

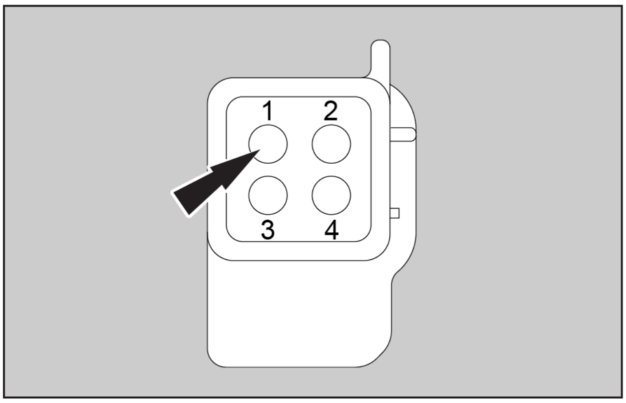
STEP 1:

- Keep the multimeter in continuity mode

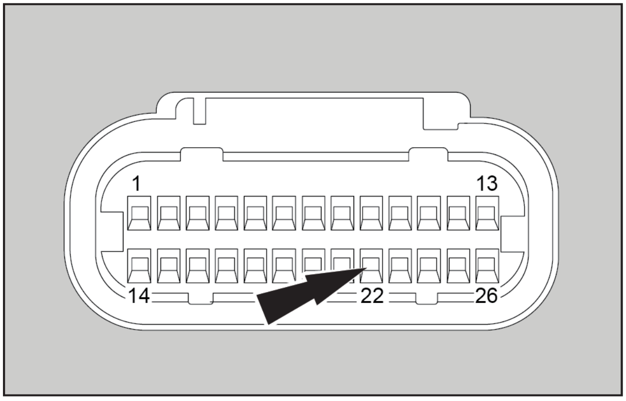


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

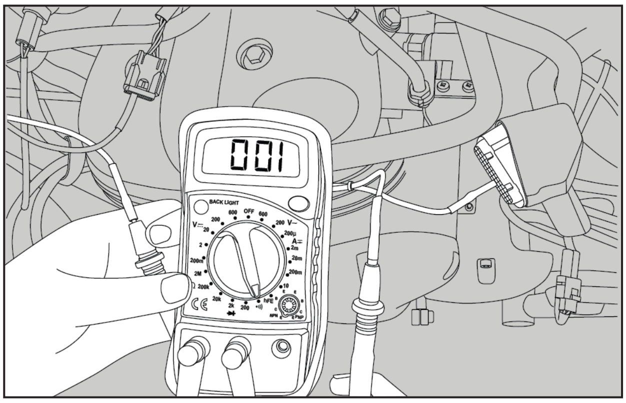




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

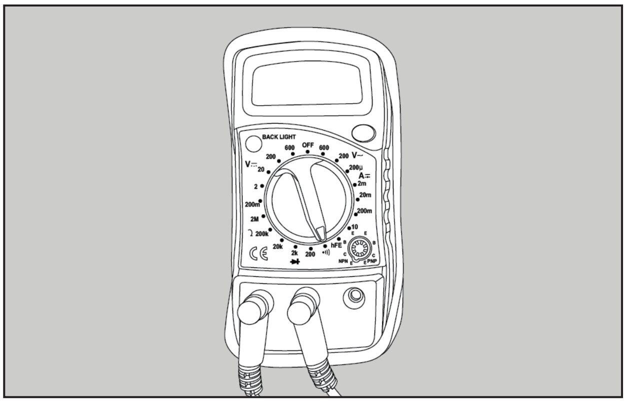


- Check for continuity (Beep Sound from the multimeter)

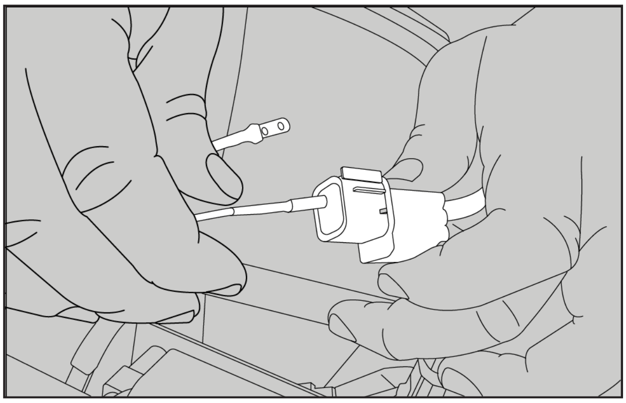


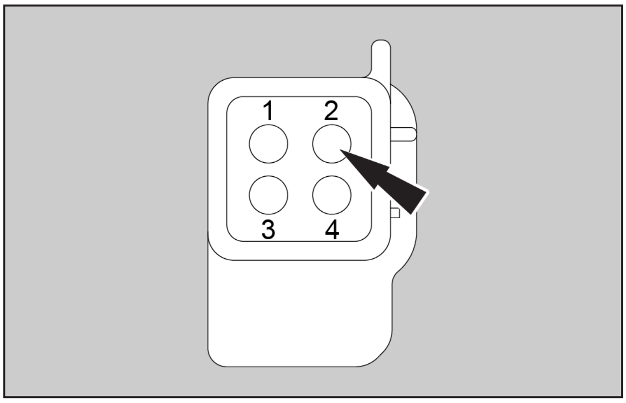
STEP2:

- Keep the multimeter in continuity mode

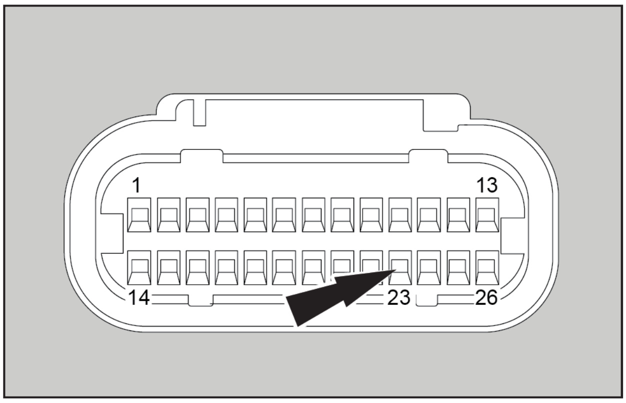


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 3 of the wiring socket.

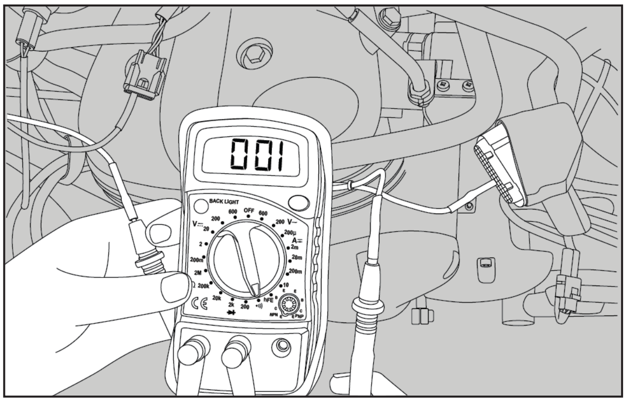




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

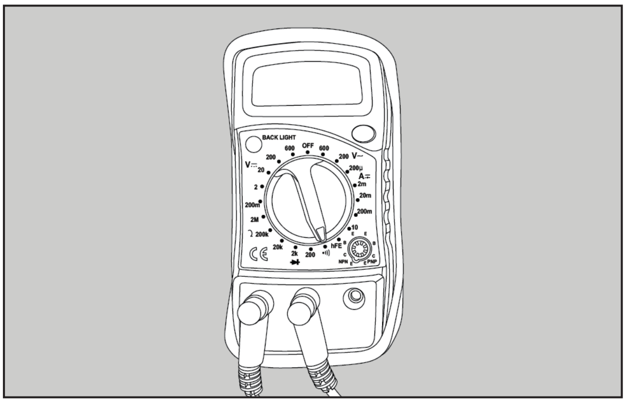


- Check for continuity (Beep Sound) from the multimeter

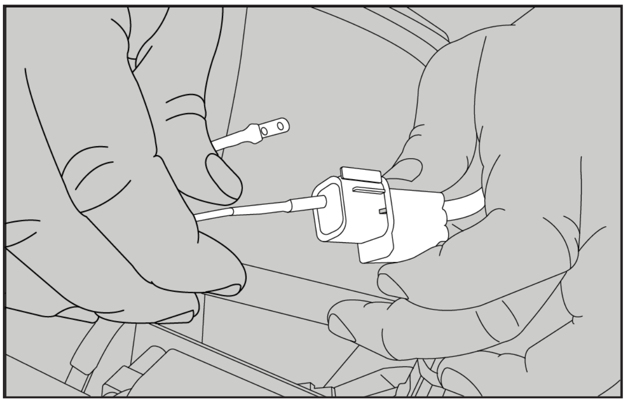


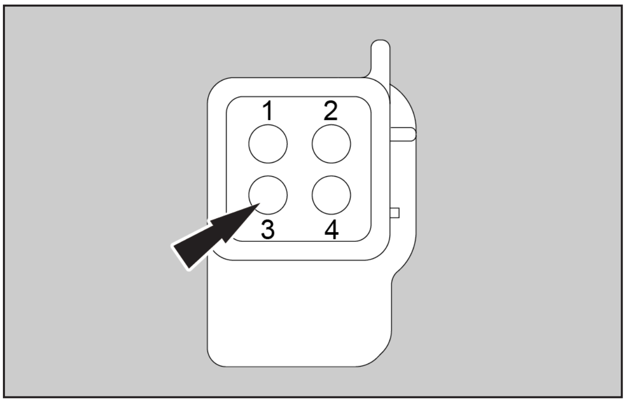
STEP 3:

- Keep the multimeter in continuity mode

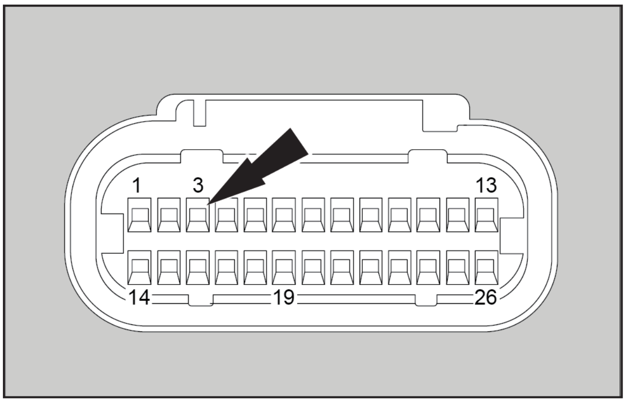


- Connect Test lead wire 60 series (blue color) with the yellow tag to Pin 3 of the wiring socket.

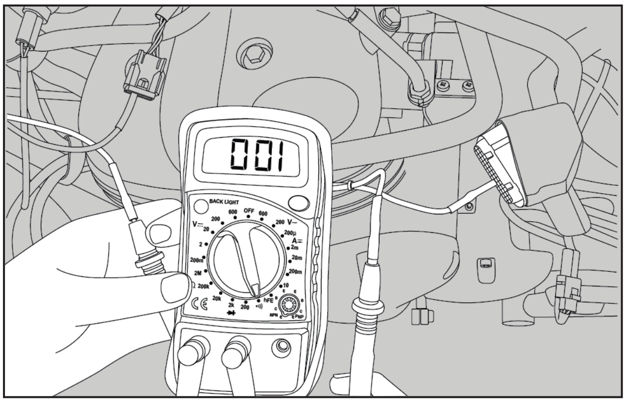




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

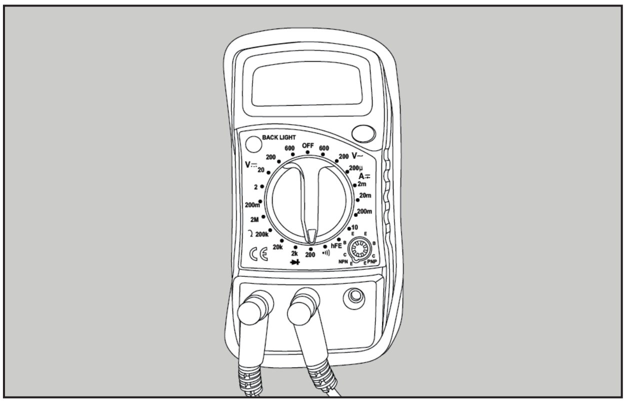


- Check for continuity (Beep Sound) from the multimeter

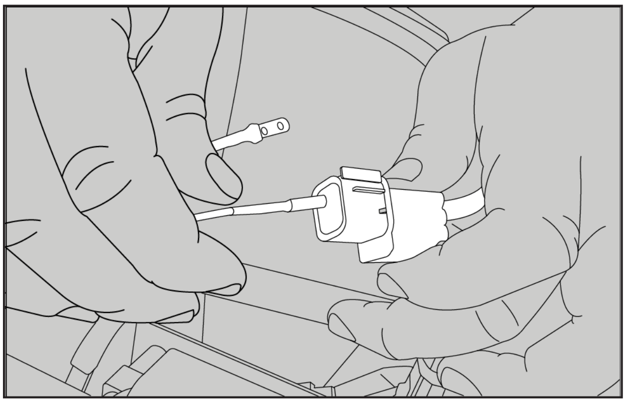


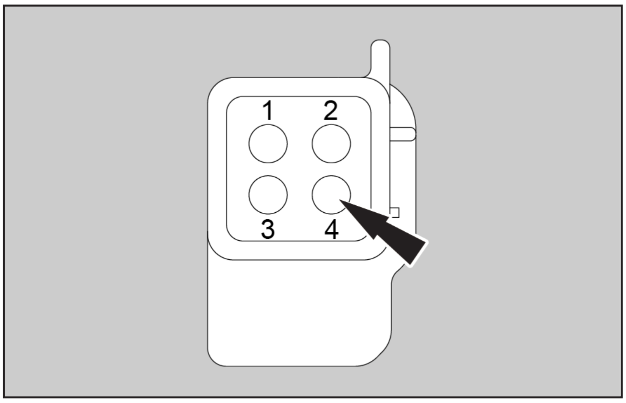
STEP 4:

- Keep the multimeter in continuity mode

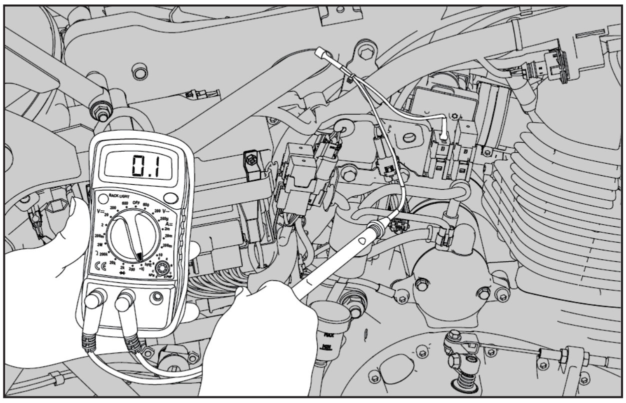


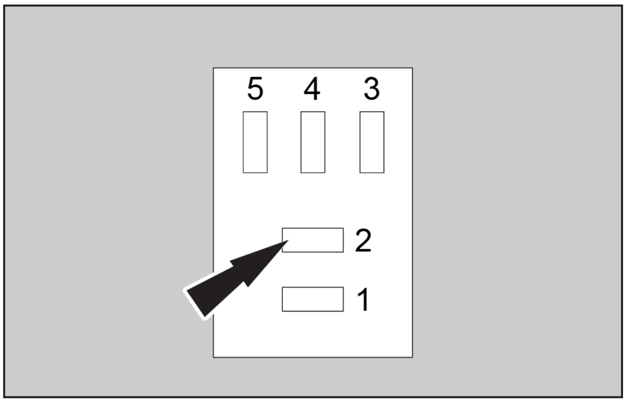
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



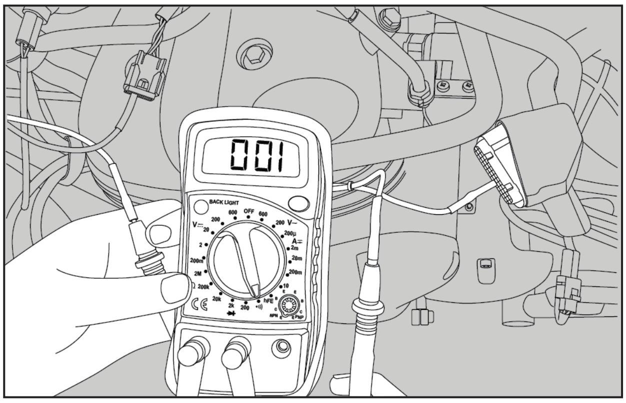


- Disconnect power relay and connect test lead wire into relay socket pin 2.





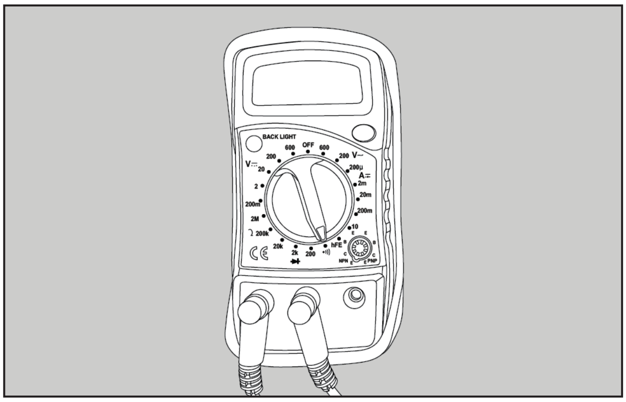
- Check for continuity (Beep Sound) from the multimeter



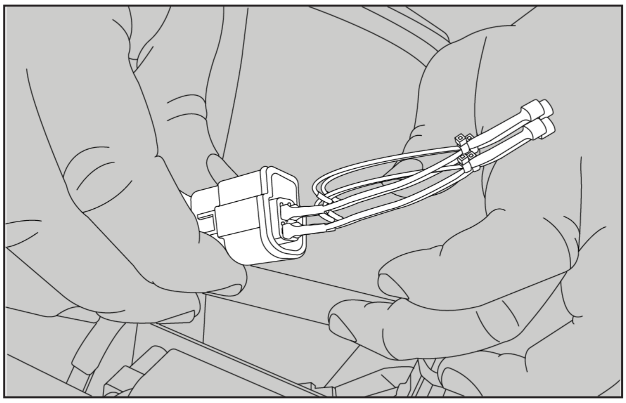
> **CAUTION**
>
> **Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.**

To check the resistance of the sensor

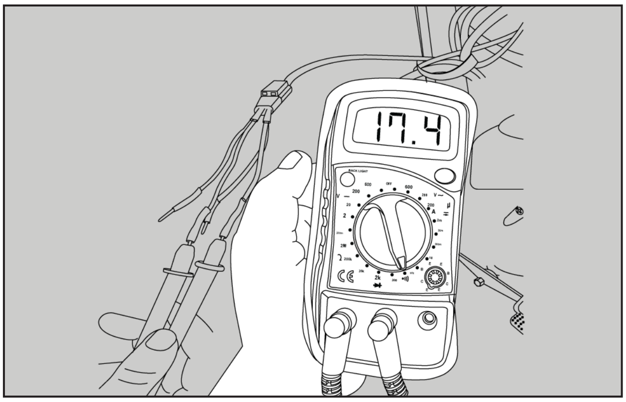
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

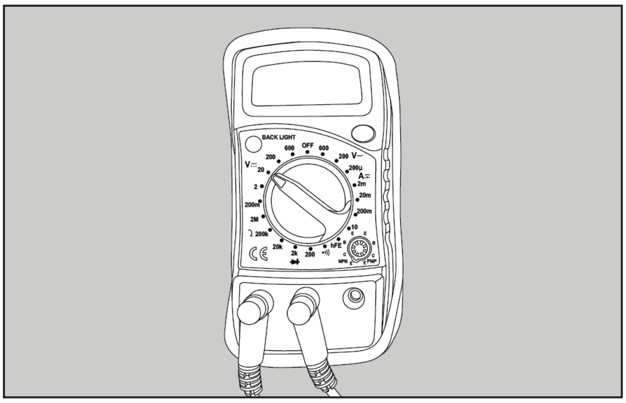


⚠ CAUTION

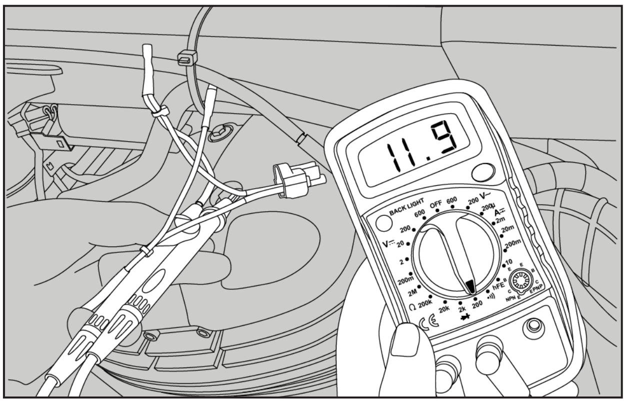
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn "ON" the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)

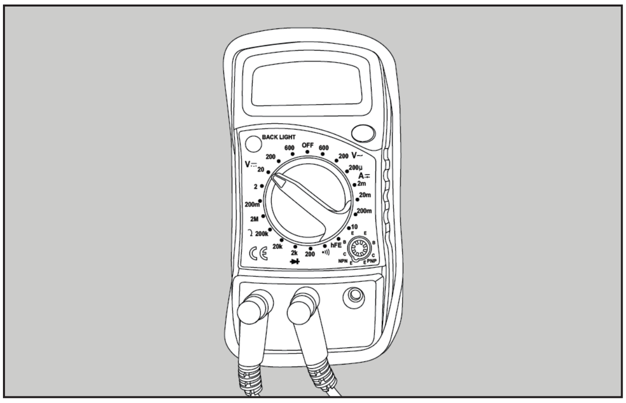


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire (60 series) in the sensor socket.

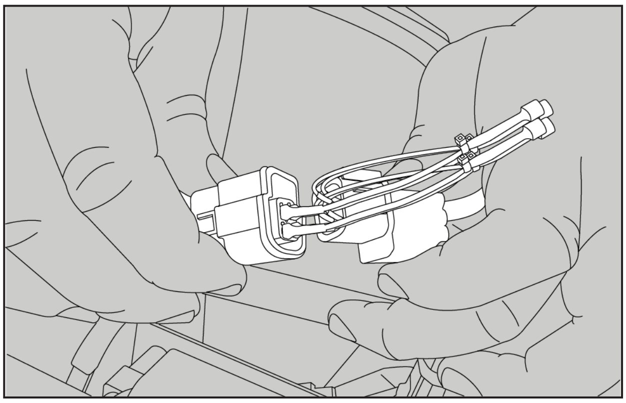
  Pin 1 with 60 series (blue color) test lead wire with black tag

  Pin 2 with 60 series (blue color) test lead wire with red tag

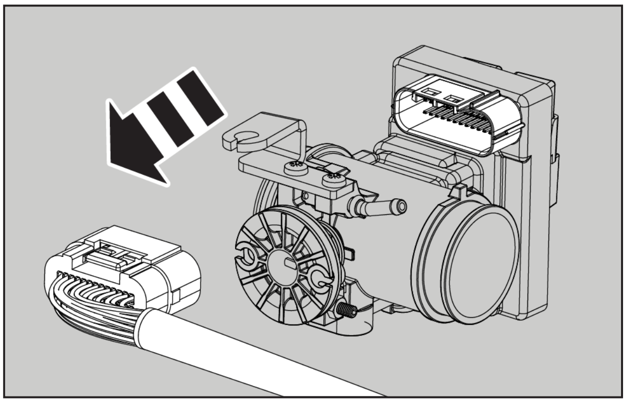
  Pin 3 with 60 series (blue color) test lead wire with Yellow tag

  Pin 4 with 60 series (blue color) test lead wire green tag

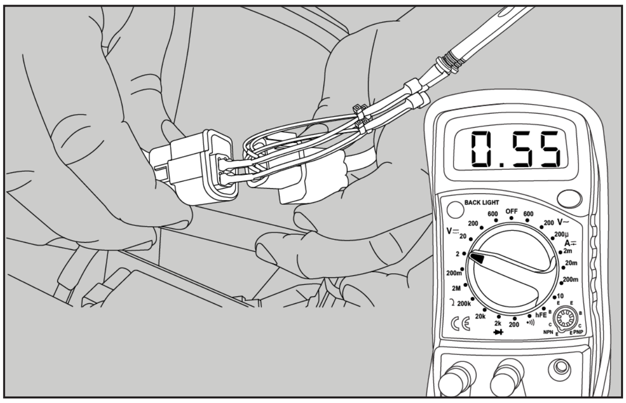
And the connect the other end of the test lead wire in the sensor wiring harness



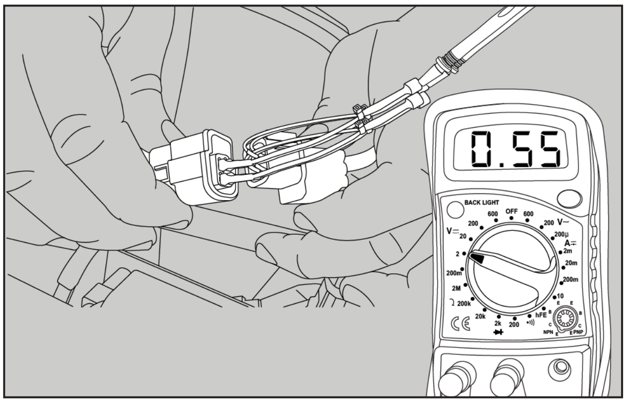
- Connect the ECU coupler to ECU



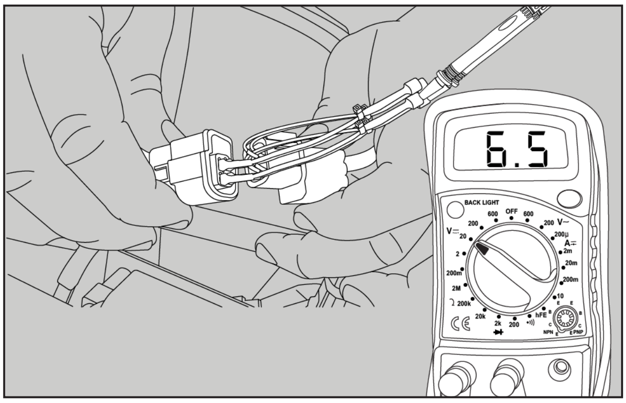
- Start the vehicle and keep the vehicle in Idling RPM
- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be between 0.4 V to 0.65 V



- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and Negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be from 0.1 V to 0.8 V. (After 45 Seconds)



- Place the positive probe in pin 4 (60 series blue color) test lead wire with green tag and negative probe in Pin 3 (60 series blue color test lead wire with yellow tag) . During idle rpm the voltage between the pins should be less than 8V



To check the spark plug

- Remove the spark plug and check the tip gap. The gap is to be between 0.7-0.8 mm. Adjust if required
- Inspect the spark plug for carbon deposits. Clean if required. Replace spark plug if necessary

To check the Ignition coil

- Check connection between ignition coil and HT lead.
- Check HT cable for damages and cuts. Replace if damaged.

To check the Fuel pump and injector

- Check fuel hose from fuel pump to injector for leaks or kinks.
- Check proper functioning of injector
- Check fuel flow delivery (190ml for 3 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), and Sensor voltage not varying from <0.3V to >0.7 V (After 45 sec from engine start) you have to replace the Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) and Sensor voltage not within the specified limit (0.4 V to 0.65 V - Ignition ON and Kill ON condition) you have to replace the ECU
- If spark plug is not under specification Please change the spark plug
- If ignition coil is defective or out of specification please change the Ignition coil
- If Injector flow rate is not as per specification Please replace the injector
- If fuel pump flow rate is not as per specification Please replace the Fuel pump

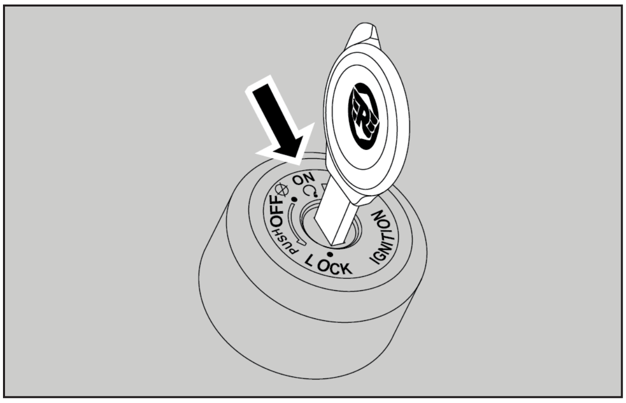
It is recommended to replace Lambda or Oxygen Sensor/ Wiring harness / ECU / Spark Plug / Ignition Coil / Injector / Fuel Pump as per the advice from Royal Enfield only.

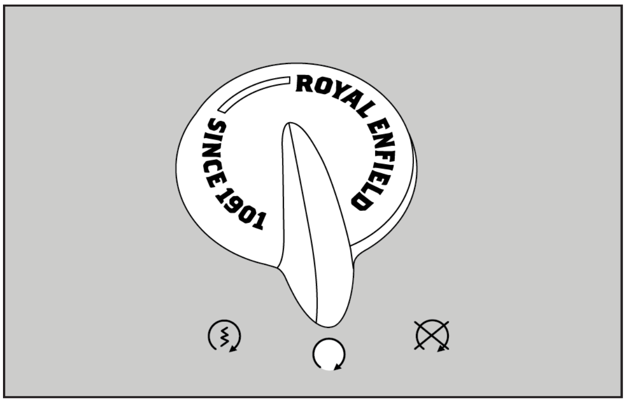
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0172 - LAMBDA SENSOR HEATER DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0172	Lambda Sensor Signal	Fuel System - Running Too Rich

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P0172

Type of error : Fuel system - Running too rich

(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

b.Preliminary Checks (Basic Check Points):

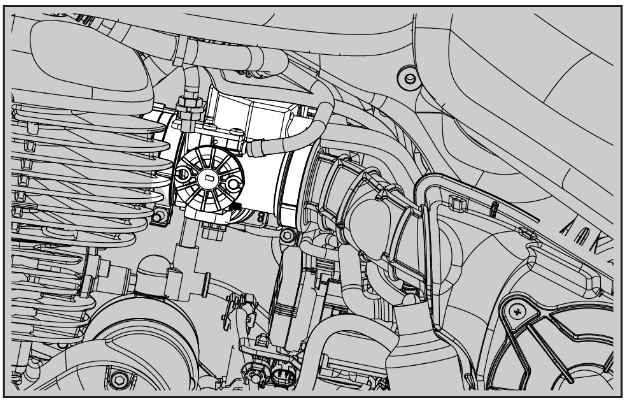
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

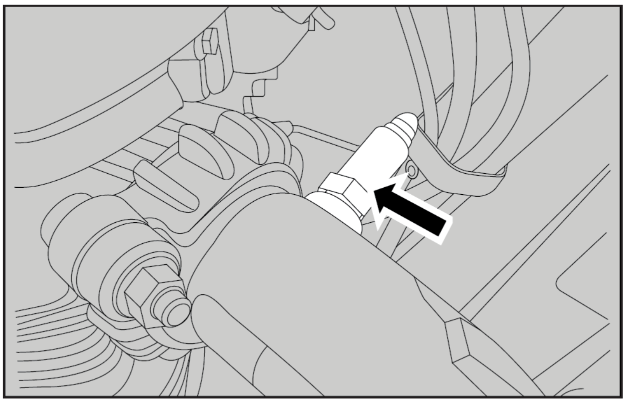
⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

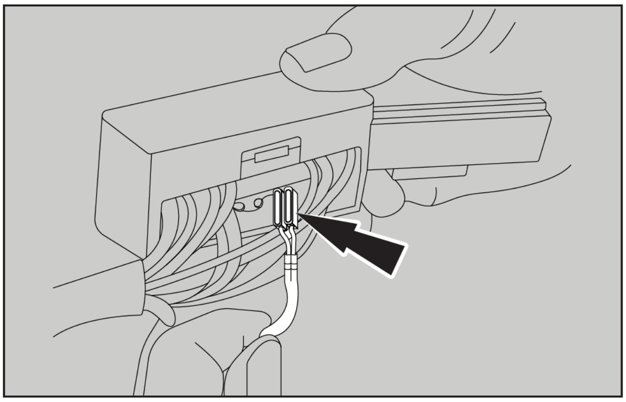
- ECU is located on the throttle body assembly



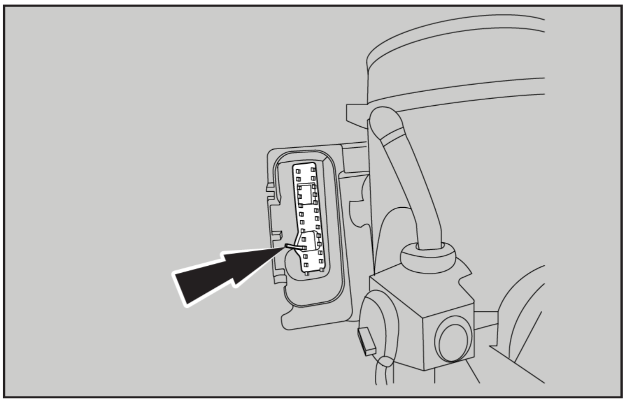
- The lambda sensor is located on the Exhaust pipe



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

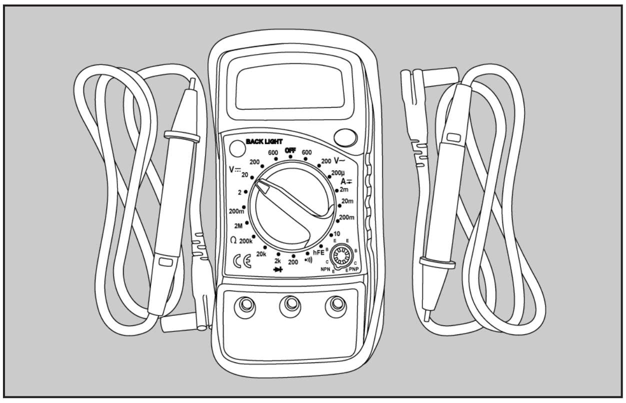
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

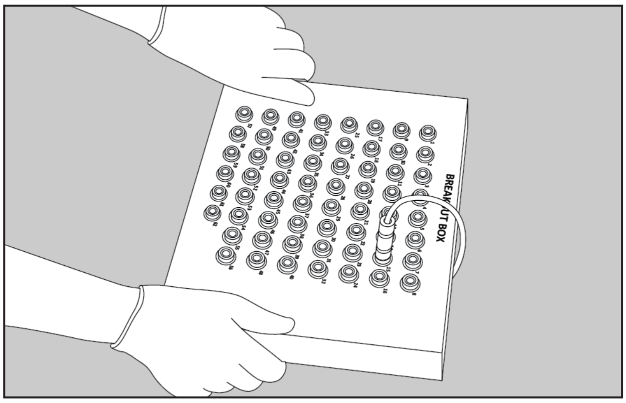
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

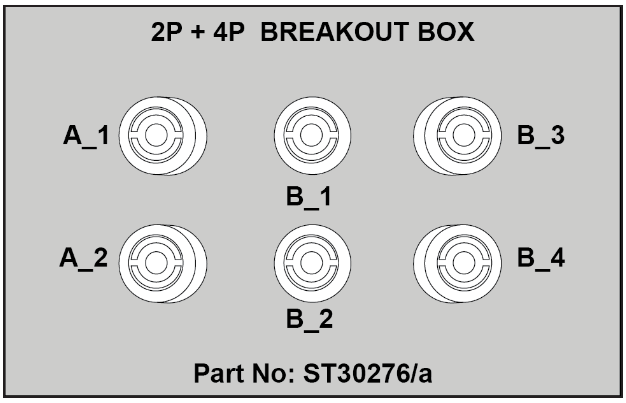
- **Tools Required**
- Multimeter (Universal)



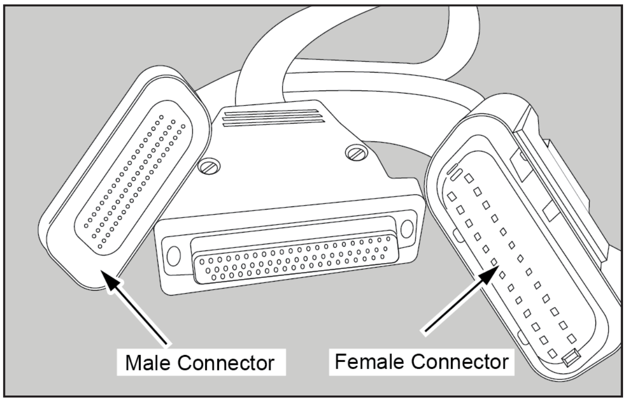
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

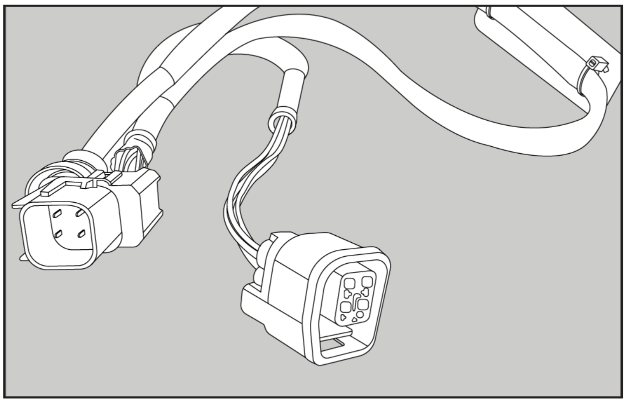
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

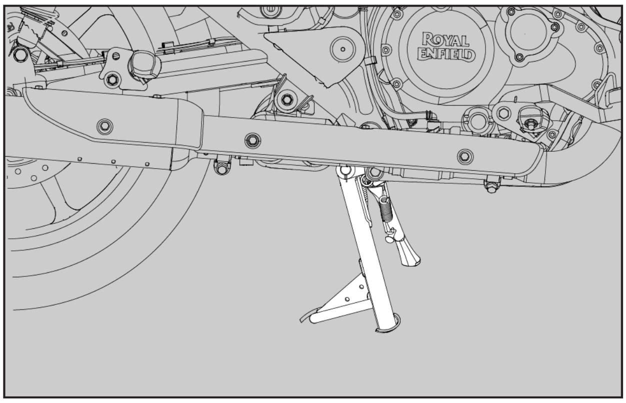

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

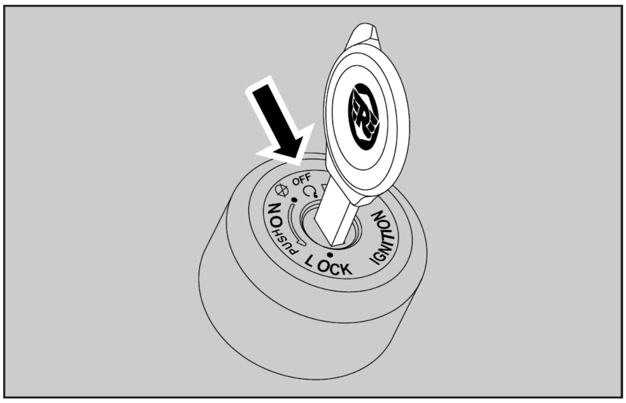


b. Pre-Checks:

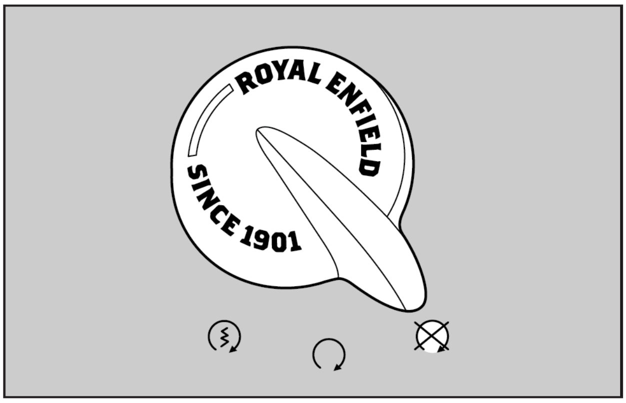
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

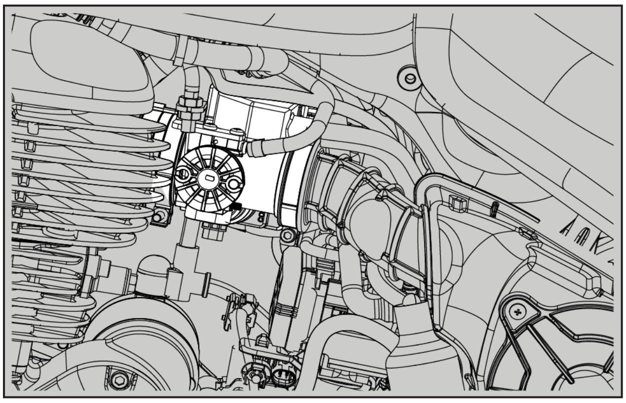
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

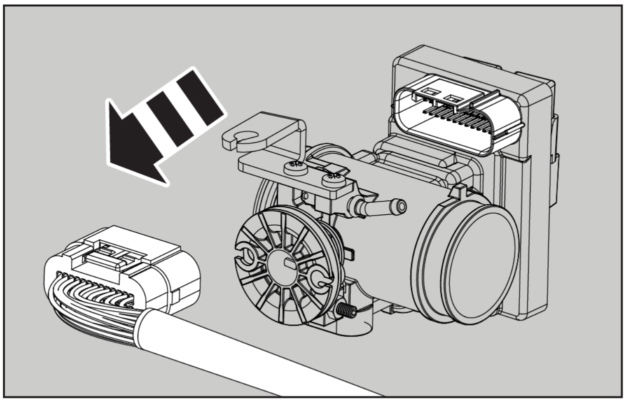
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

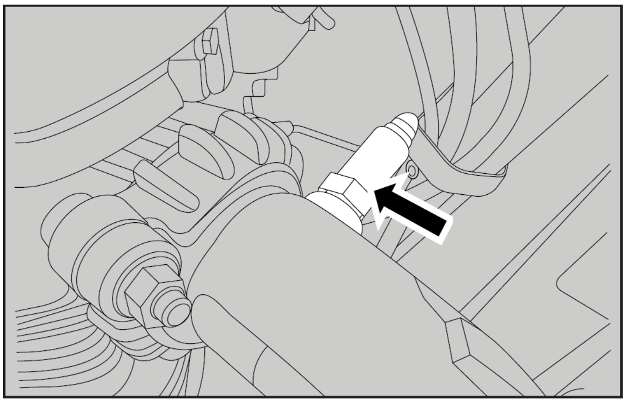
- ECU is located in the throttle body assembly



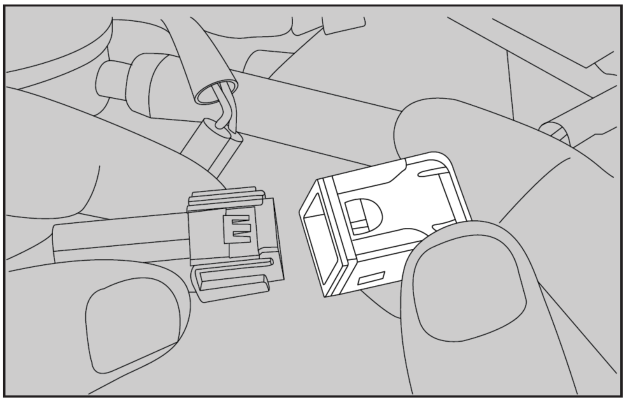
- Disconnect ECU coupler from ECU.



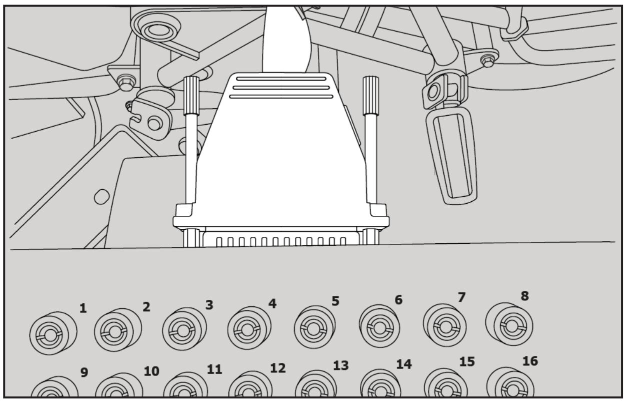
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



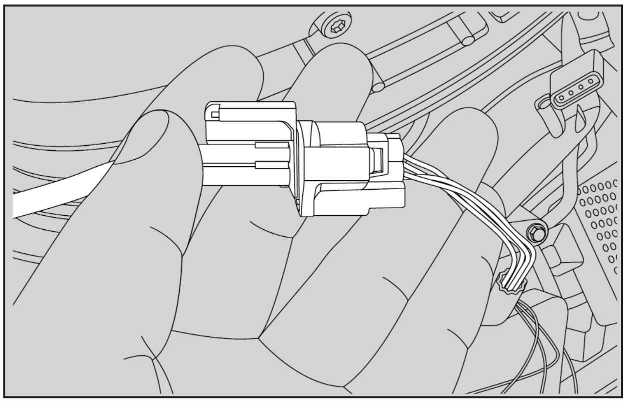
- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.

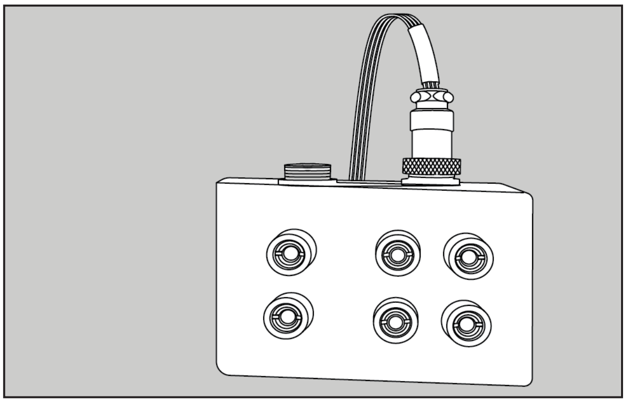


- Connect ECU Breakout box to ECU breakout box harness



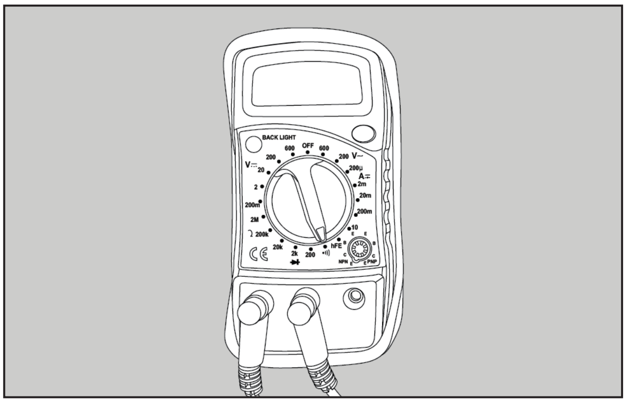
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



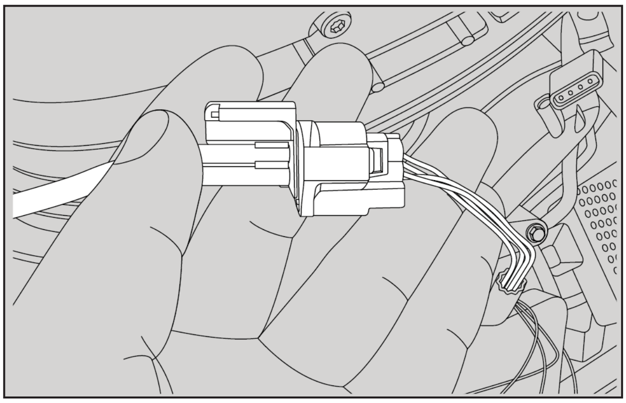


a. To check Continuity of Wiring harness

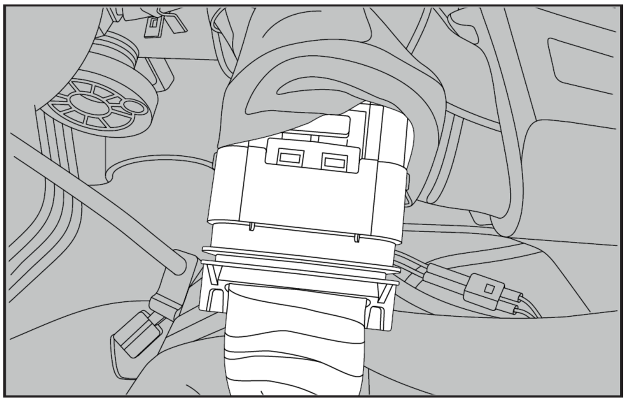
- Keep the multimeter in continuity mode



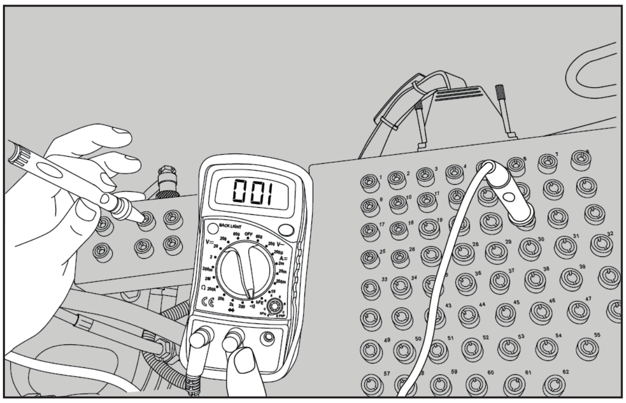
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



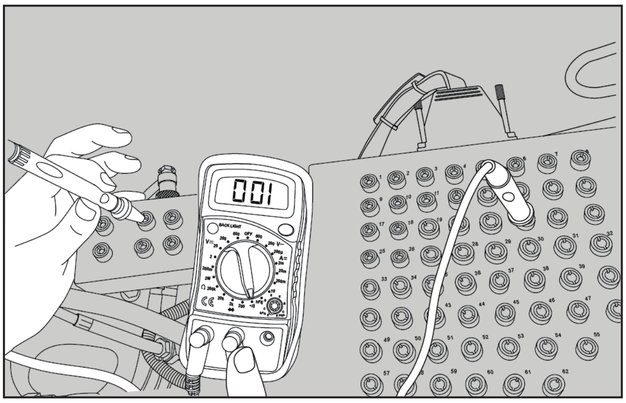
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



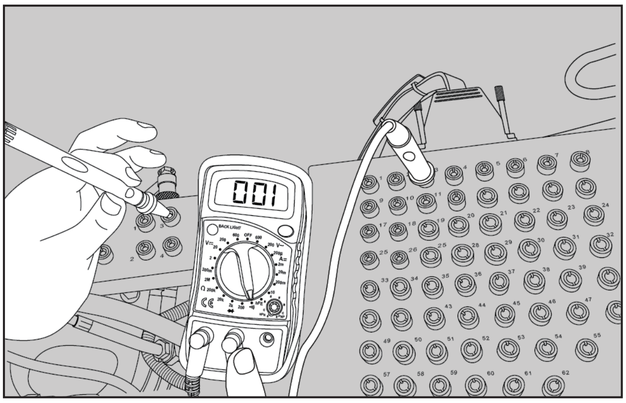
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



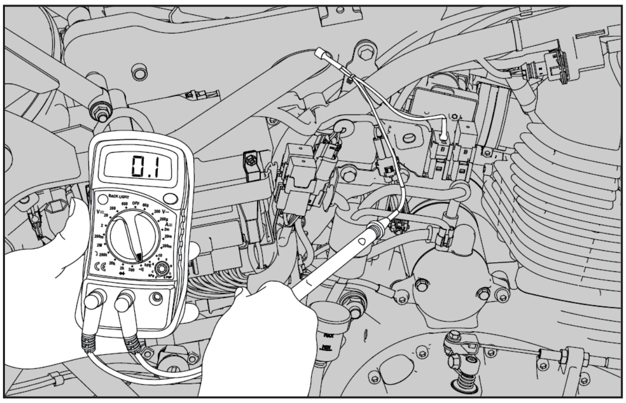
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

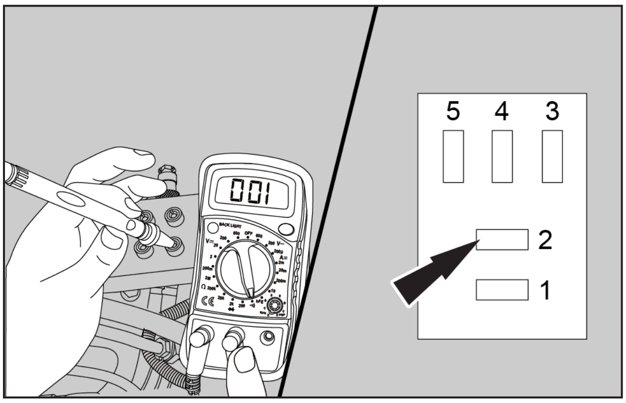


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



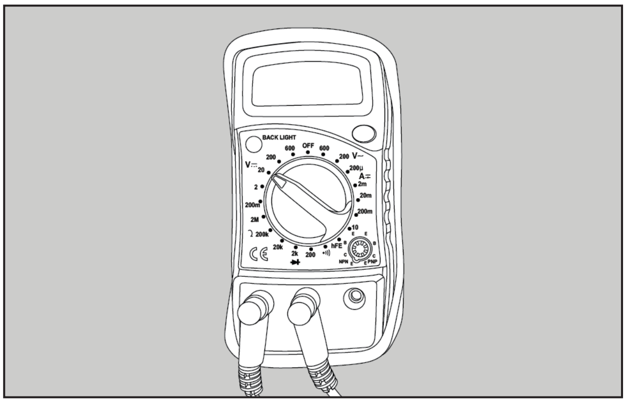
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



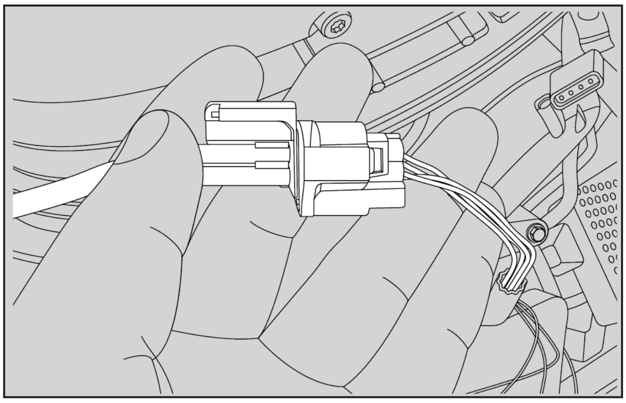


C. To check output voltage

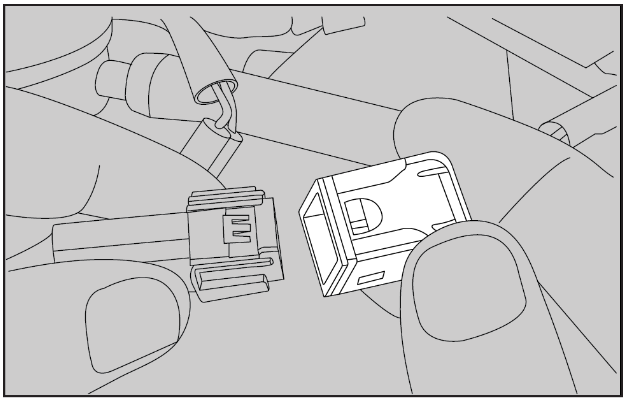
- Keep the multimeter in voltage mode (20V)



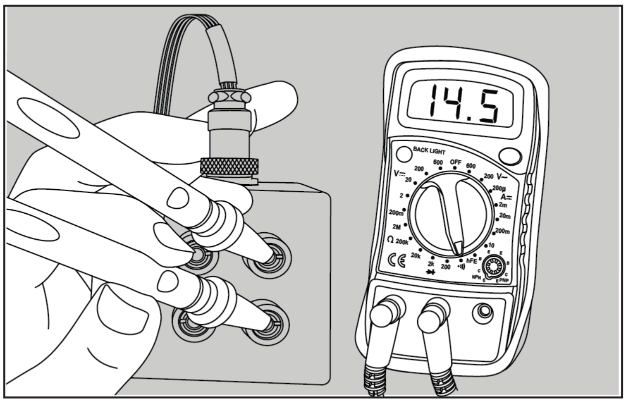
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

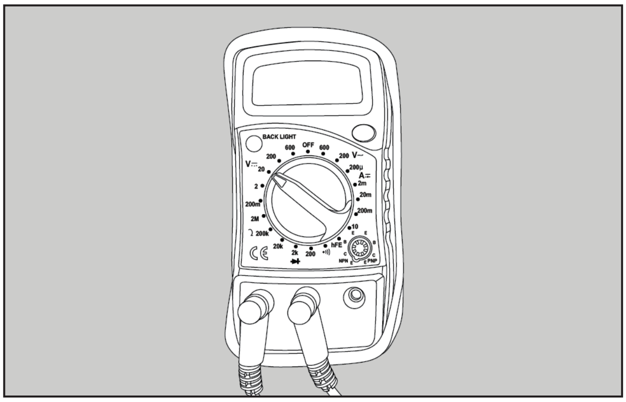


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

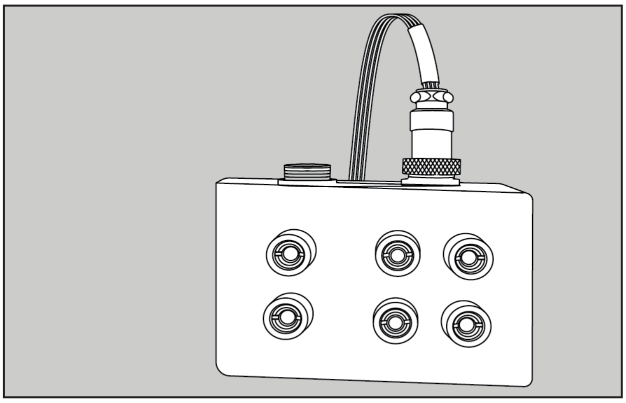


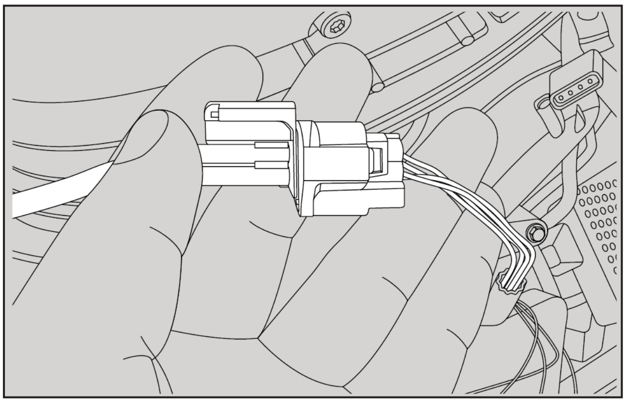
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

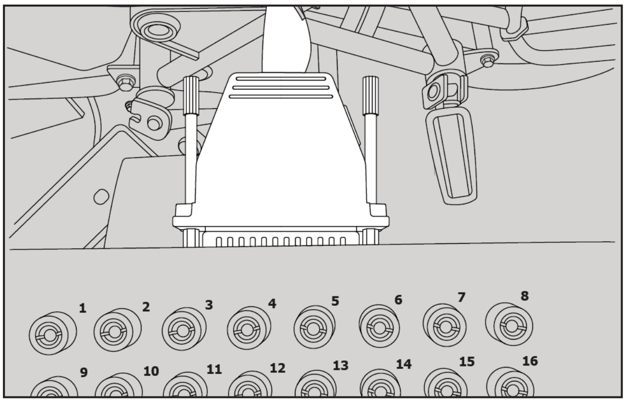


- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler





- Similarly, connect the ECU breakout box to ECU and wiring harness


1
2
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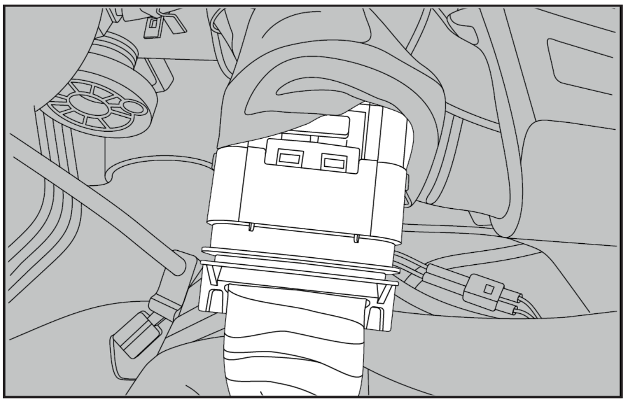
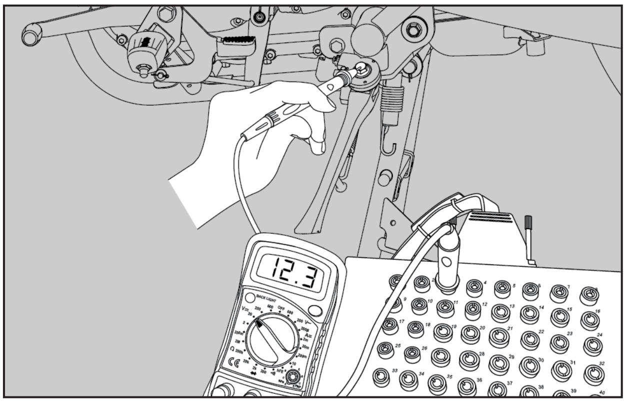
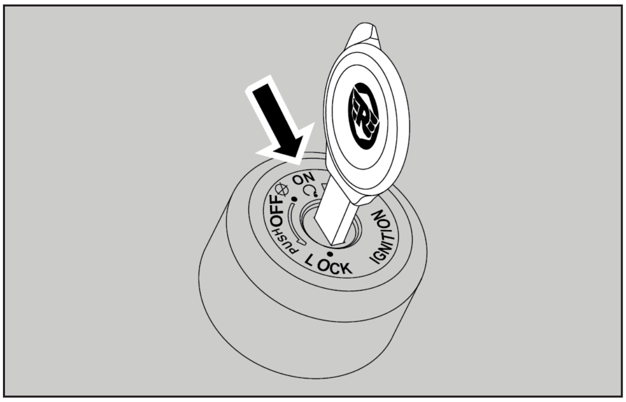
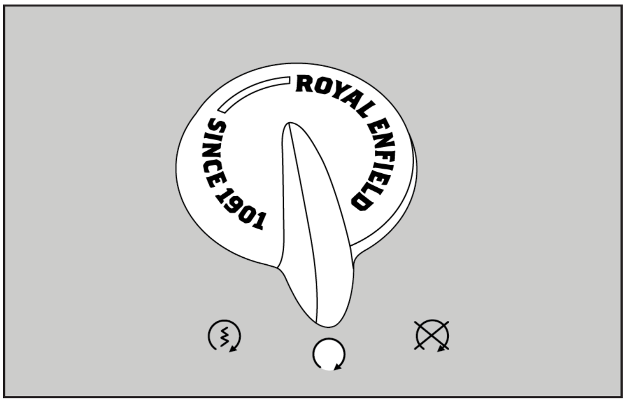


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

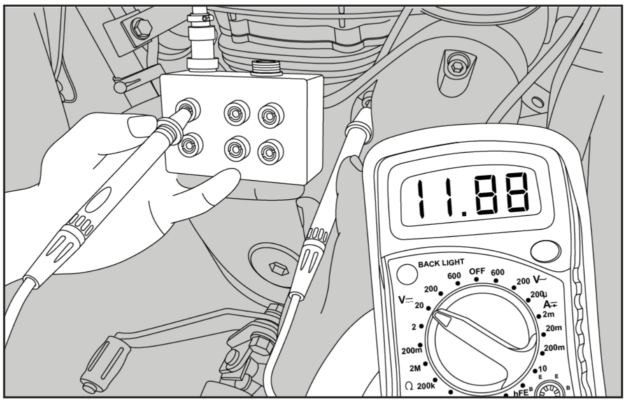


- Turn "ON" the ignition and kill switch


ON
PUSH OFF
LOCK
IGNITION

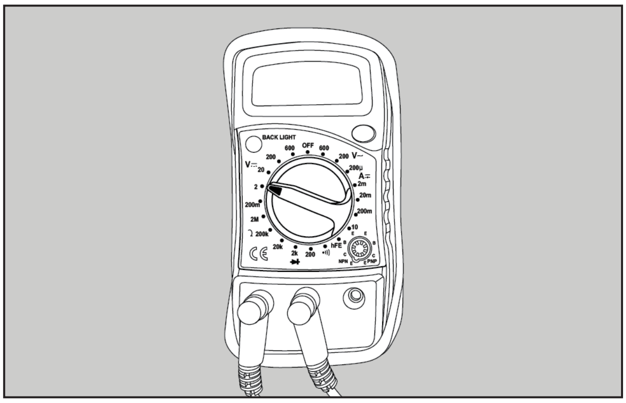

ROYAL ENFIELD
SINCE 1901

- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

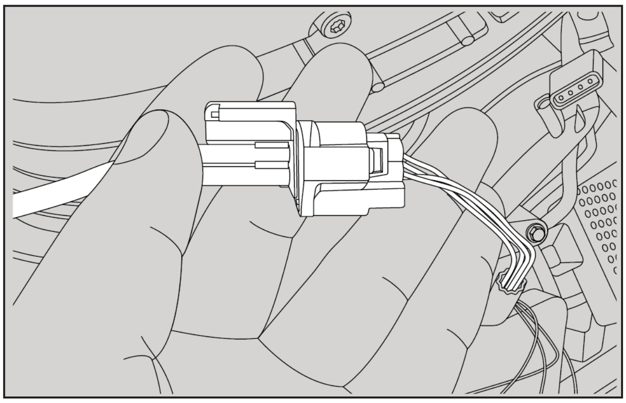

11.88
BACK LIGHT
OFF

To Check output voltage check

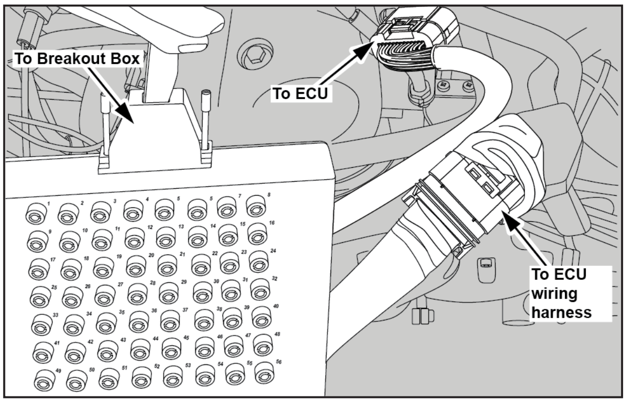
- Keep the multimeter in Voltage mode (2 V).


BACK LIGHT
OFF

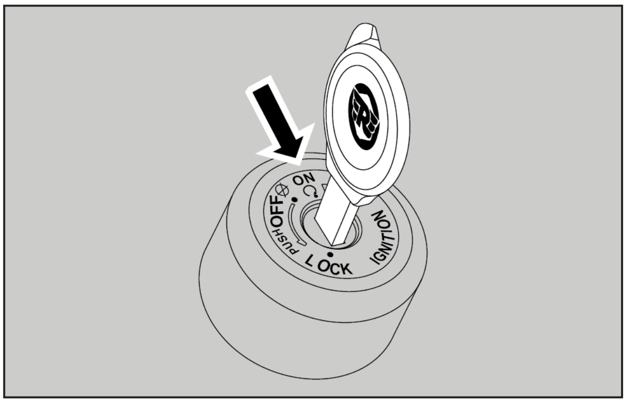
- Connect the female end of the Sensor breakout harness into the sensor coupler

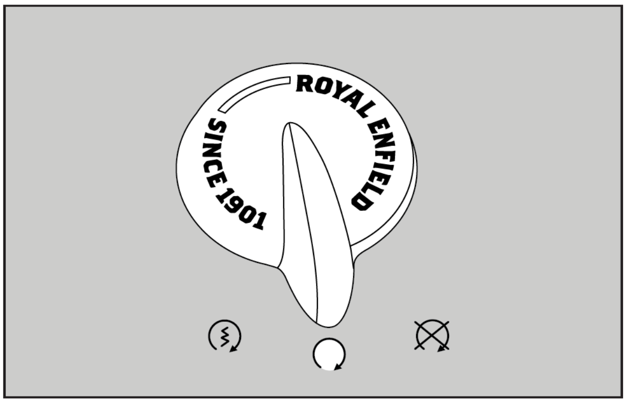


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn "ON" the kill switch and ignition switch

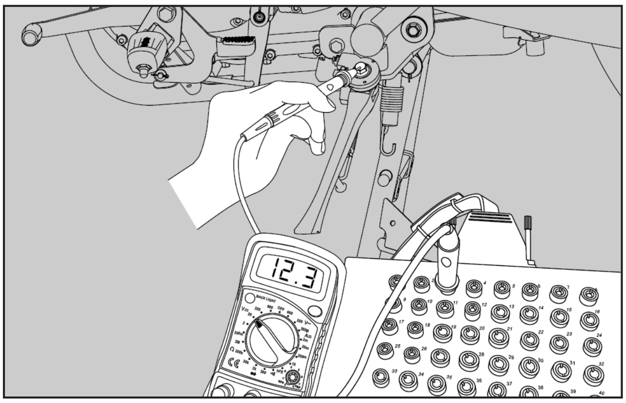

ON
PUSH OFF
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

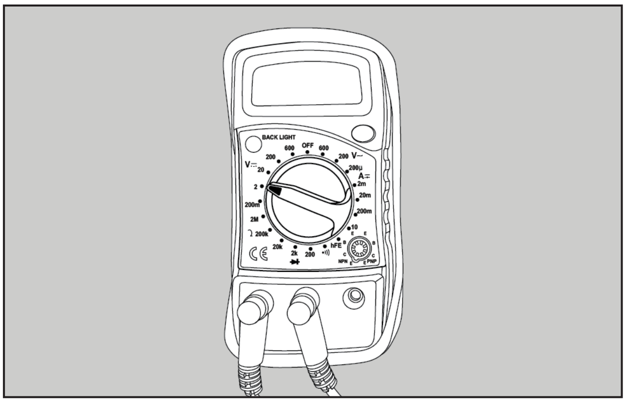
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



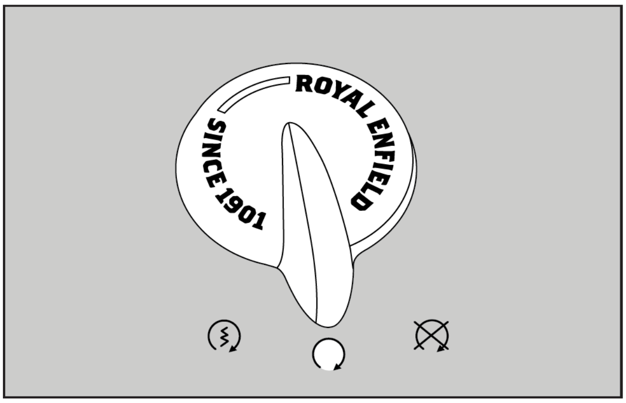
- Switch "OFF" the Engine

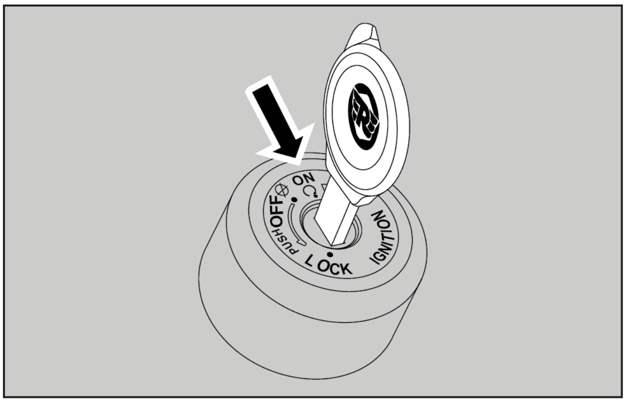
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

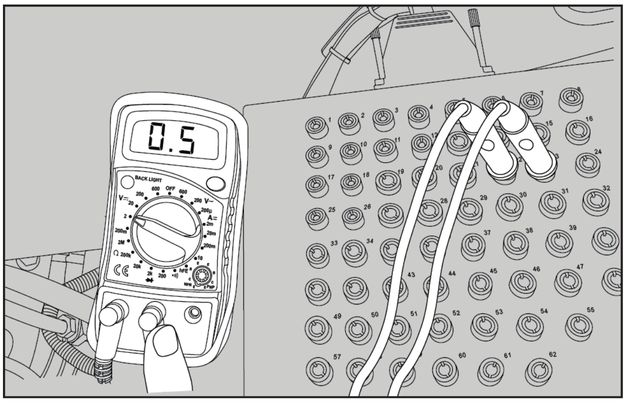


- Turn "ON" the Ignition switch and kill switch





- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU break outbox



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

To check the spark plug

- Remove the spark plug and check the tip gap. The gap is to be between 0.7-0.8 mm. Adjust if required
- Inspect the spark plug for carbon deposits. Clean if required. Replace spark plug if necessary

To check the Ignition coil

- Check connection between ignition coil and HT lead.
- Check HT cable for damages and cuts. Replace if damaged.

To check the Fuel pump and injector

- Check fuel hose from fuel pump to injector for leaks or kinks.
- Check proper functioning of injector
- Check fuel flow delivery (190ml for 3 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), and Sensor voltage not varying from <0.3V to >0.7 V (After 45 sec from engine start) you have to replace the Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) and Sensor voltage not within the specified limit (0.4 V to 0.65 V - Ignition ON and Kill ON condition) you have to replace the ECU
- If spark plug is not under specification Please change the spark plug
- If ignition coil is defective or out of specification please change the Ignition coil
- If Injector flow rate is not as per specification Please replace the injector
- If fuel pump flow rate is not as per specification Please replace the Fuel pump

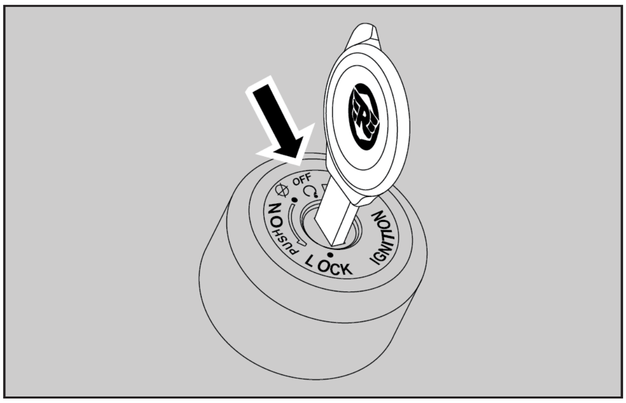
It is recommended to replace Lambda or Oxygen Sensor/ Wiring harness / ECU / Spark Plug / Ignition Coil / Injector / Fuel Pump as per the advice from Royal Enfield only.

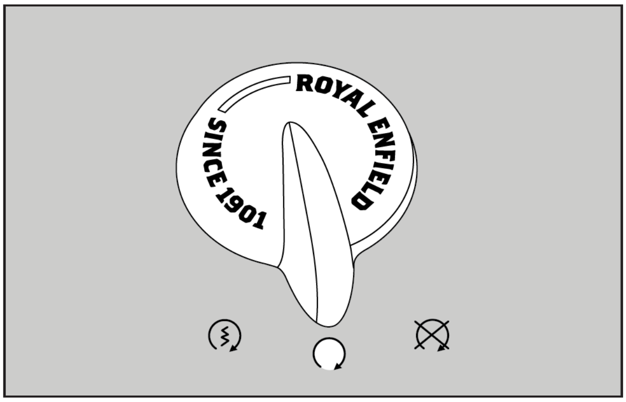
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

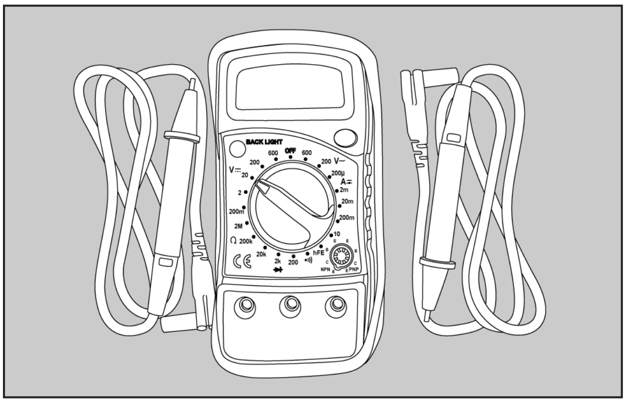
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)



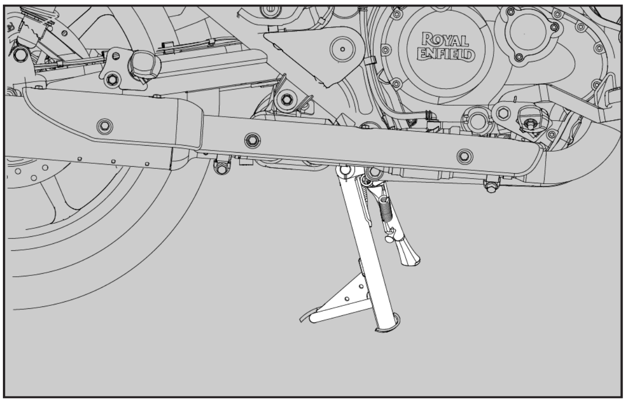
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

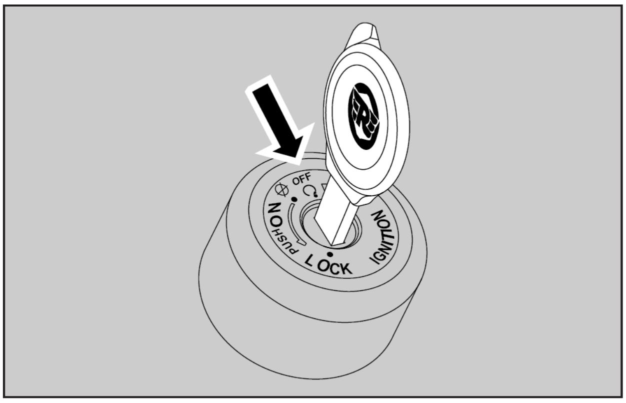
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

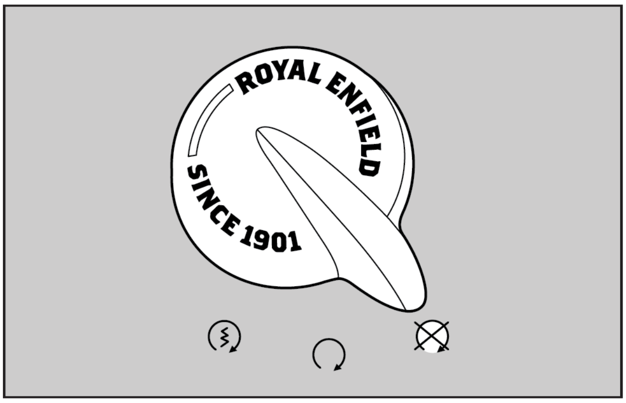
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

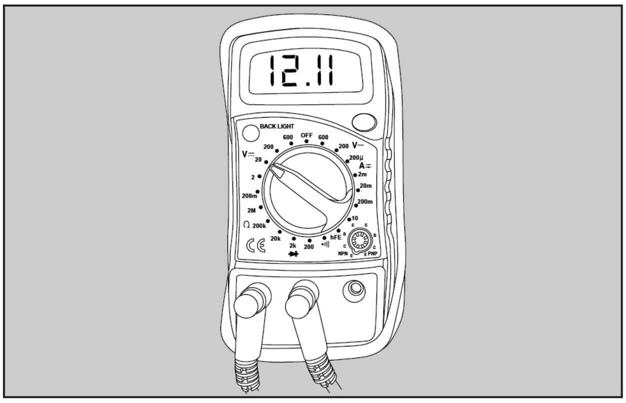


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

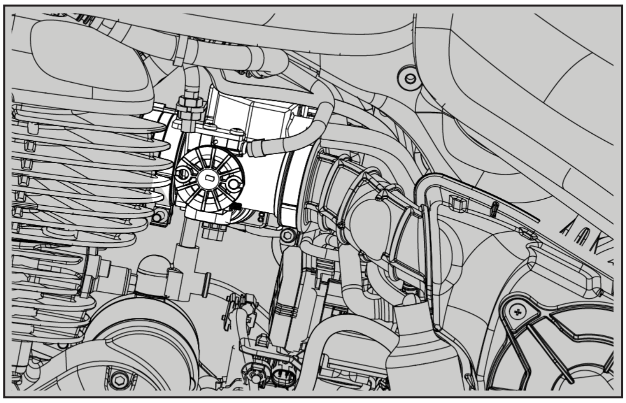
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/oxygen sensor coupler*

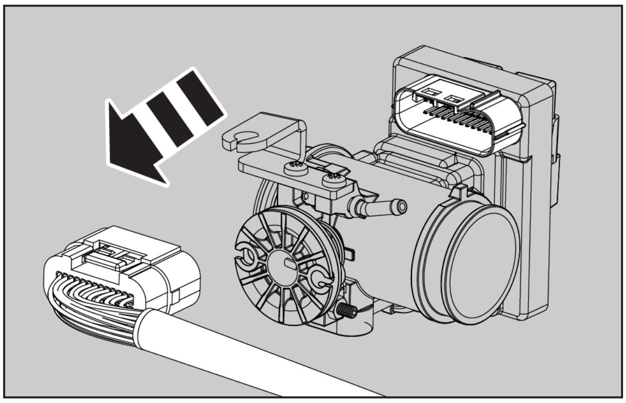
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

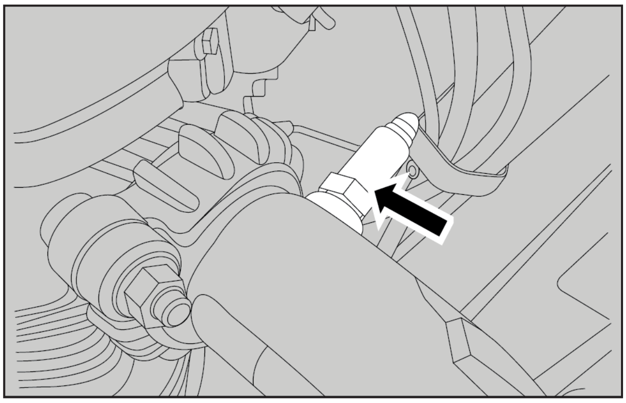
- ECU is located on the Throttle body assembly



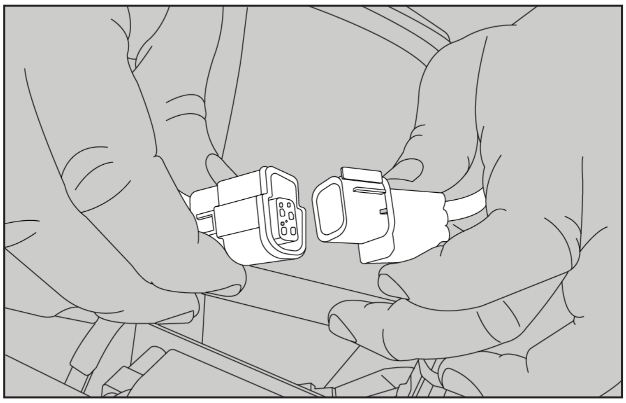
- Disconnect the ECU wiring harness coupler from ECU



- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



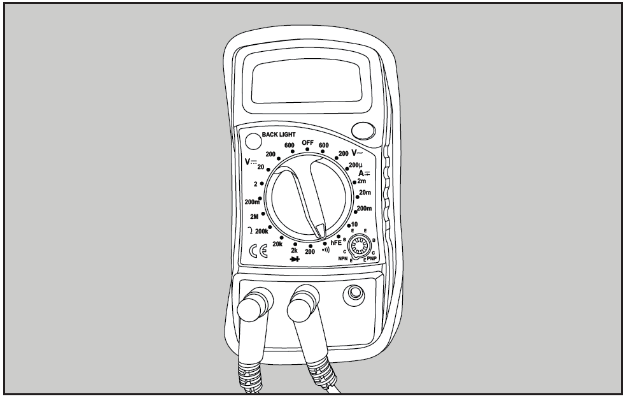
- Disconnect the oxygen sensor coupler.



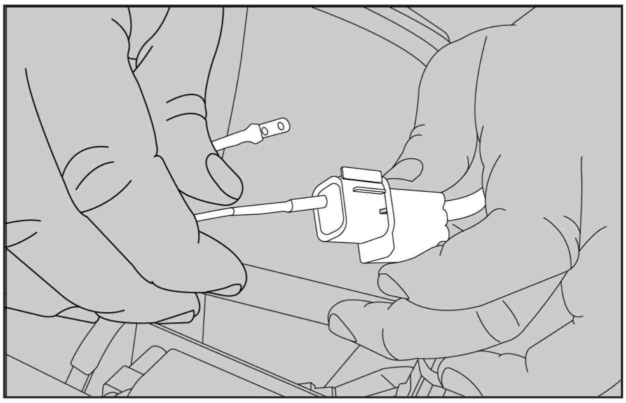
To check Continuity of the Wiring Harness

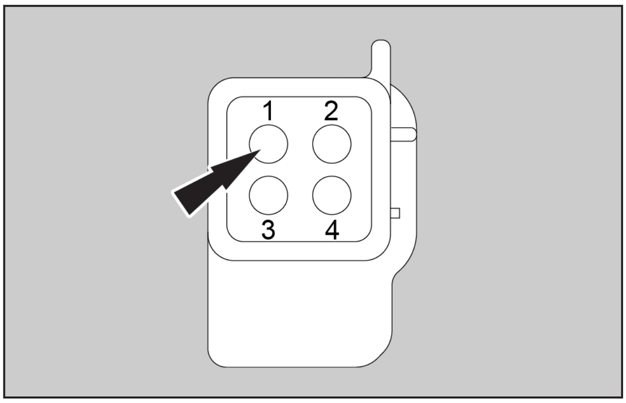
STEP 1:

- Keep the multimeter in continuity mode

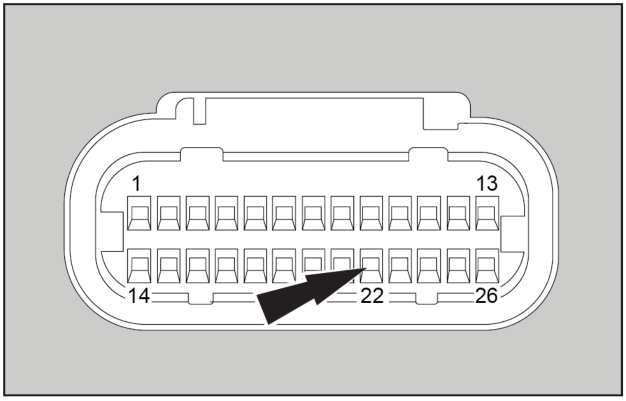


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

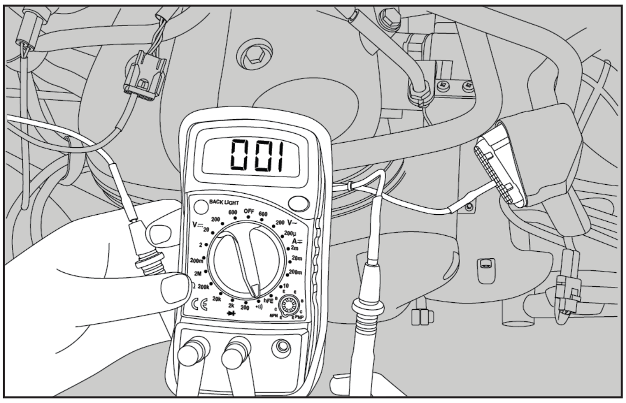




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

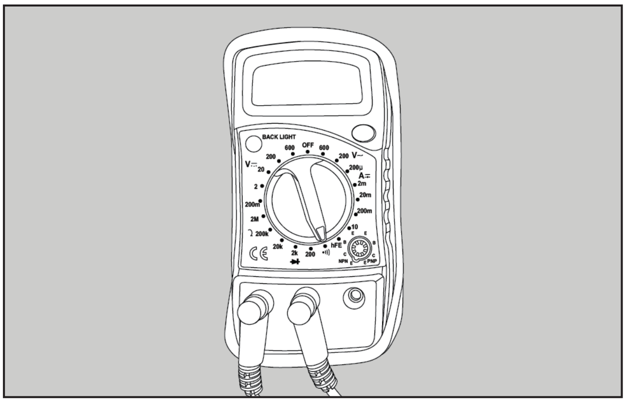


- Check for continuity (Beep Sound from the multimeter)

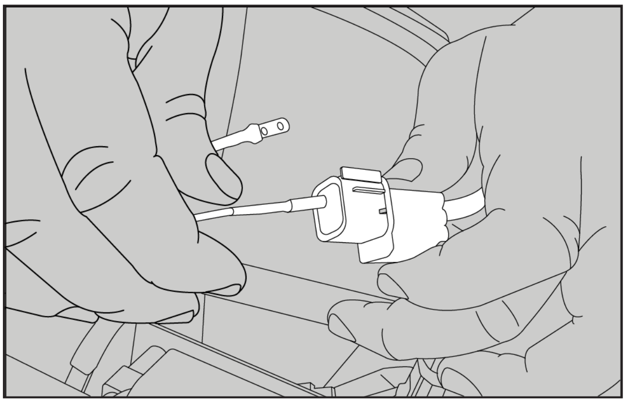


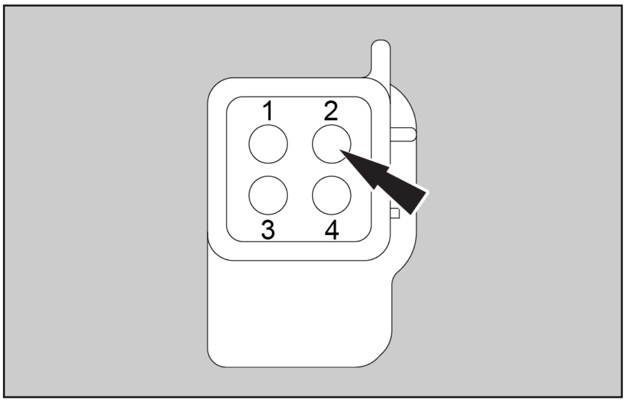
STEP2:

- Keep the multimeter in continuity mode

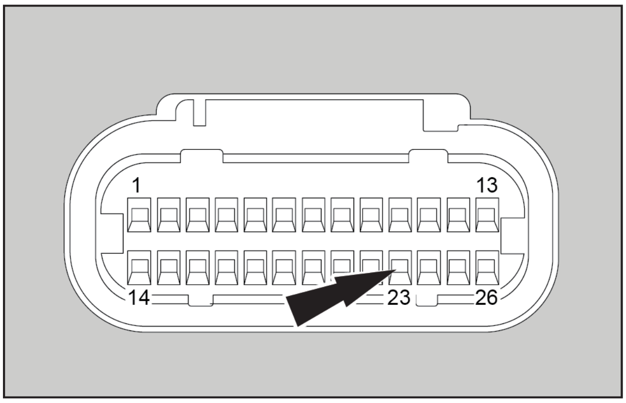


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 3 of the wiring socket.

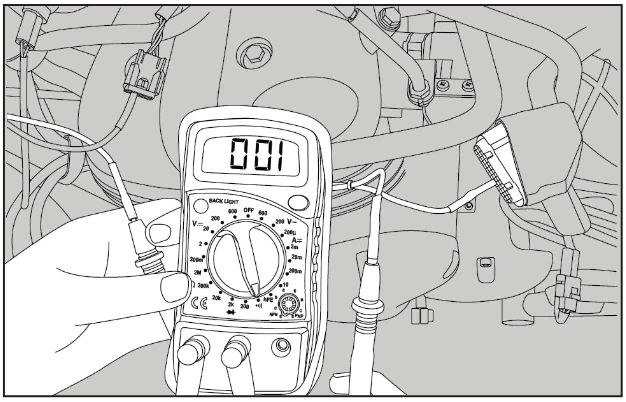




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

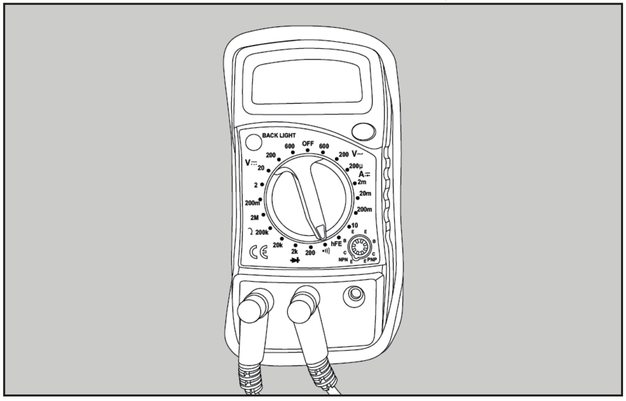


- Check for continuity (Beep Sound) from the multimeter

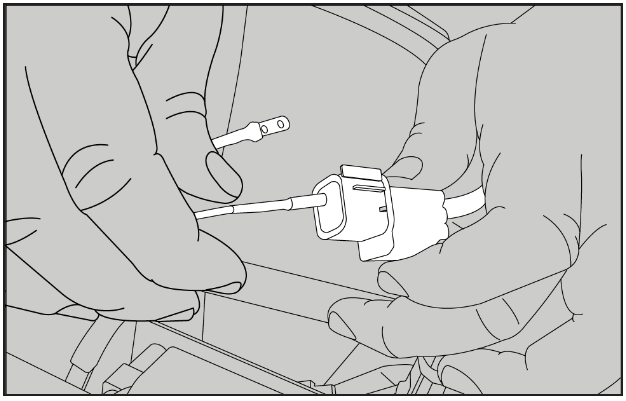


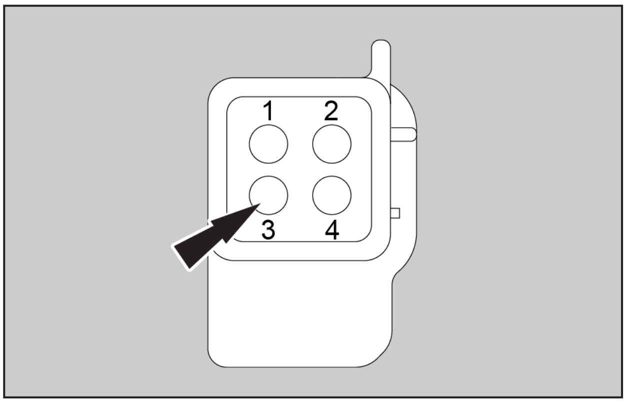
STEP 3:

- Keep the multimeter in continuity mode

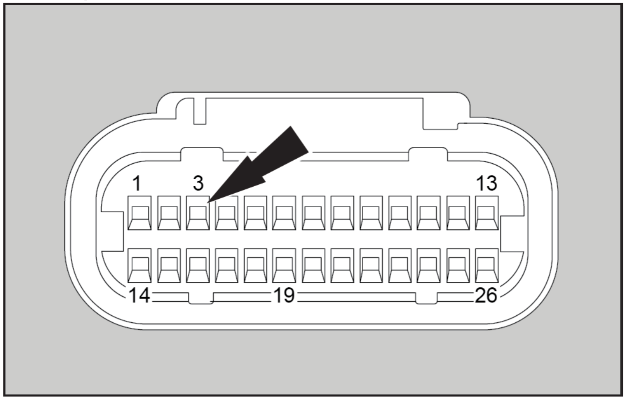


- Connect Test lead wire 60 series (blue color) with the yellow tag to Pin 3 of the wiring socket.

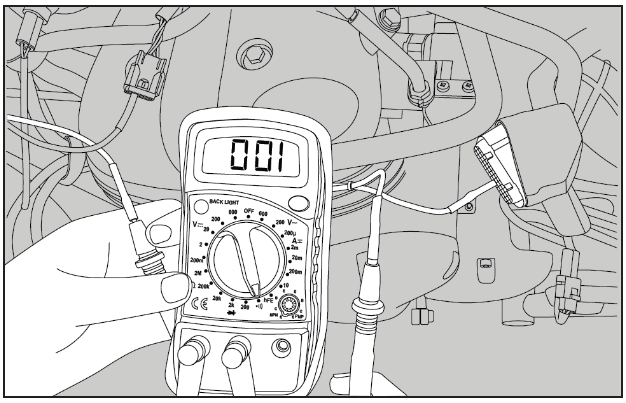




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

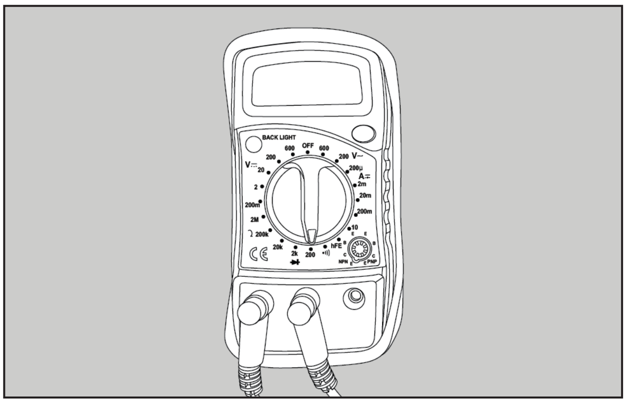


- Check for continuity (Beep Sound) from the multimeter

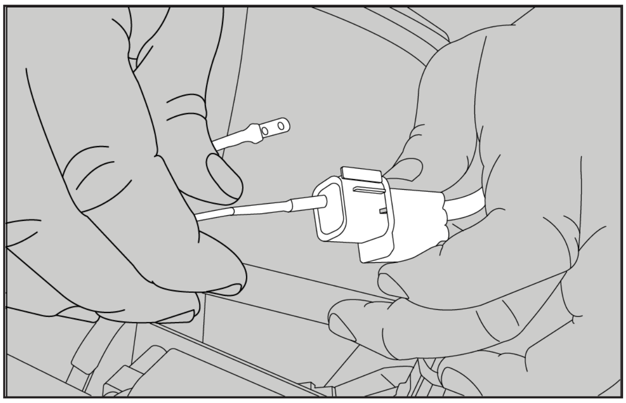


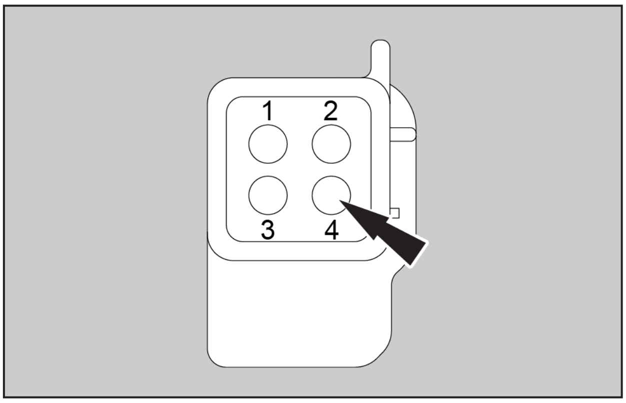
STEP 4:

- Keep the multimeter in continuity mode

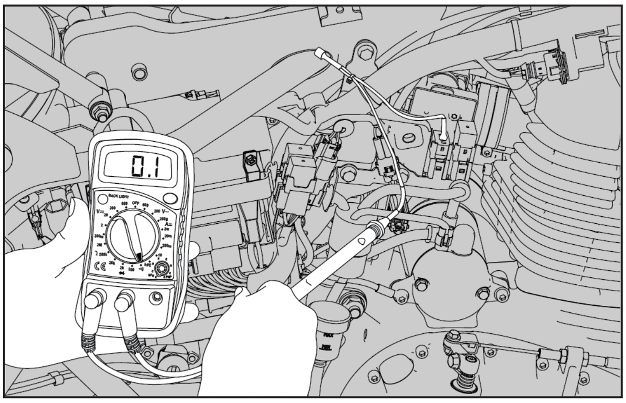


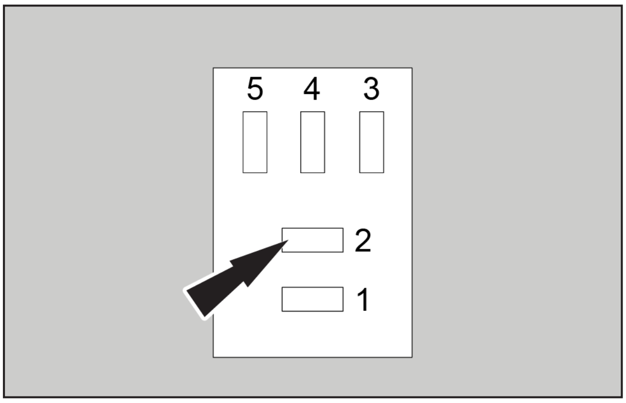
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



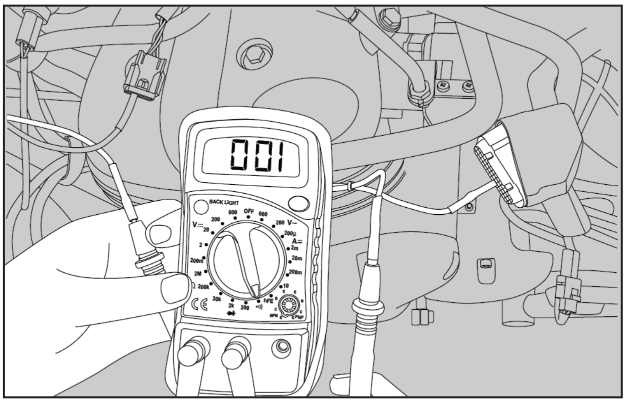


- Disconnect power relay and connect test lead wire into relay socket pin 2.





- Check for continuity (Beep Sound) from the multimeter

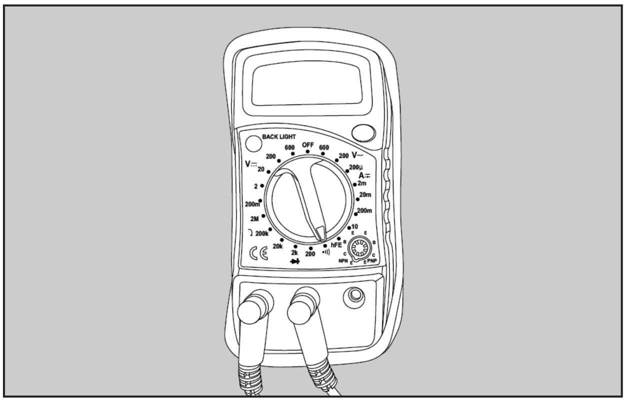


⚠ CAUTION

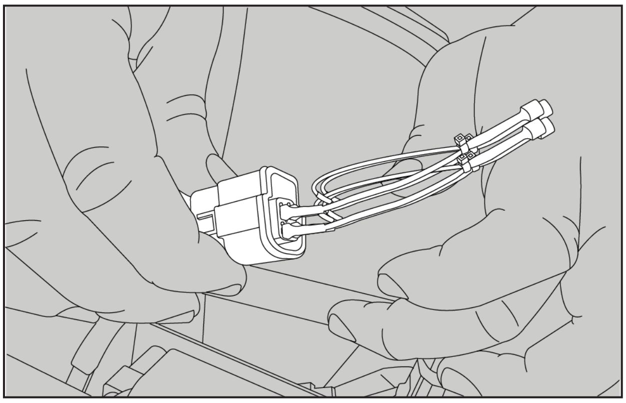
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the resistance of the sensor

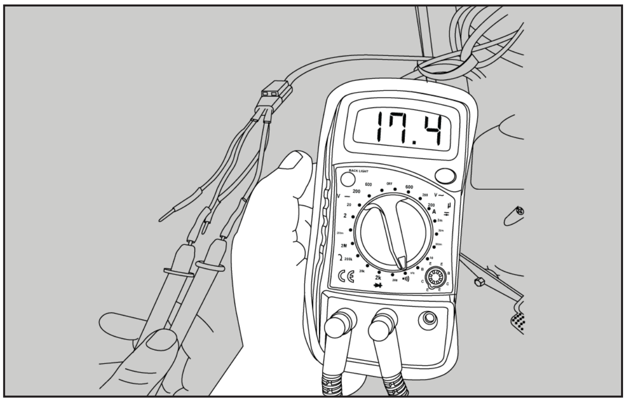
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

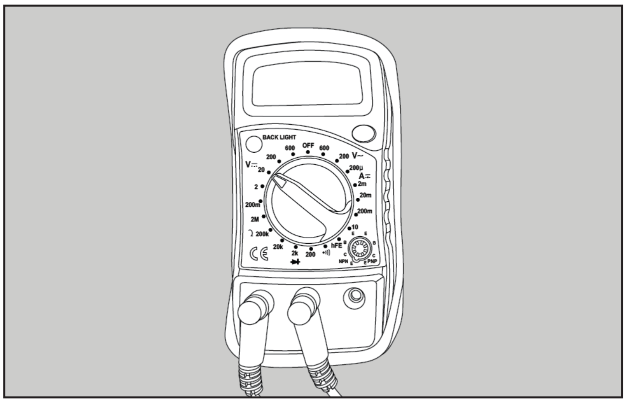


⚠ CAUTION

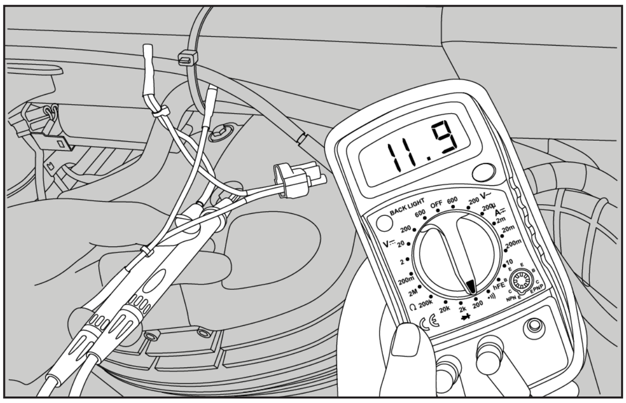
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn “ON” the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)

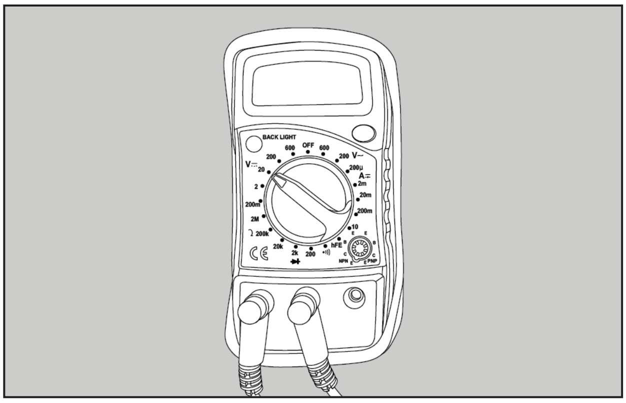


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire (60 series) in the sensor socket.

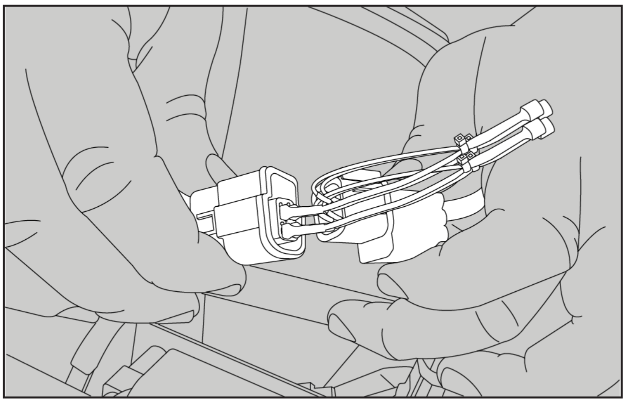
  Pin 1 with 60 series (blue color) test lead wire with black tag

  Pin 2 with 60 series (blue color) test lead wire with red tag

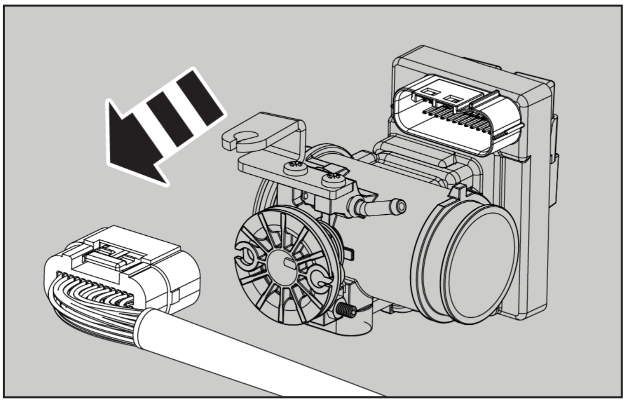
  Pin 3 with 60 series (blue color) test lead wire with Yellow tag

  Pin 4 with 60 series (blue color) test lead wire green tag

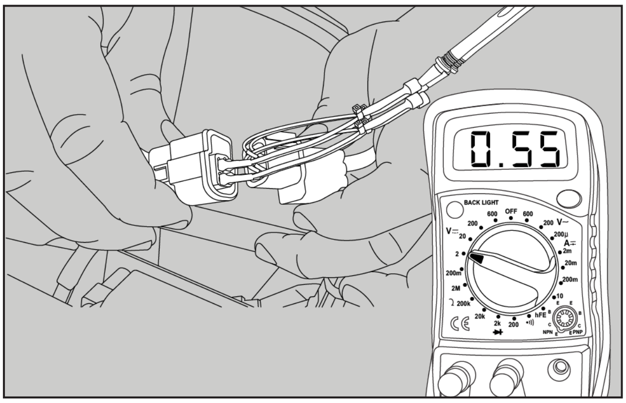
And the connect the other end of the test lead wire in the sensor wiring harness



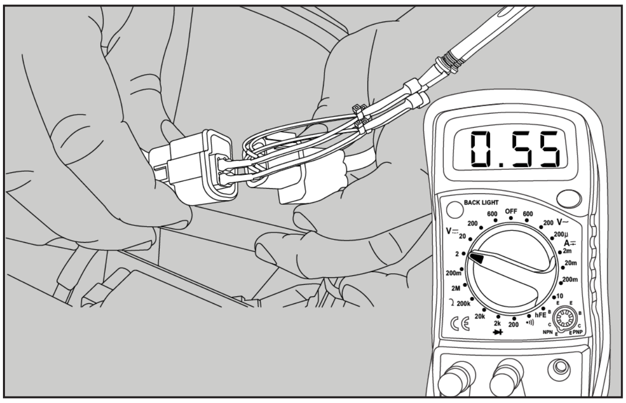
- Connect the ECU coupler to ECU



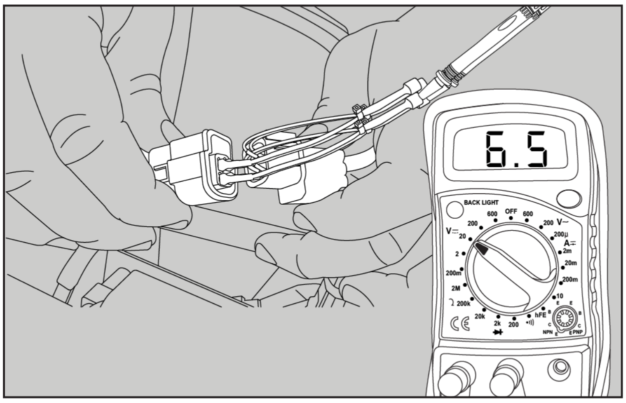
- Start the vehicle and keep the vehicle in Idling RPM
- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be between 0.4 V to 0.65 V



- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and Negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be from 0.1 V to 0.8 V. (After 45 Seconds)



- Place the positive probe in pin 4 (60 series blue color) test lead wire with green tag and negative probe in Pin 3 (60 series blue color test lead wire with yellow tag) . During idle rpm the voltage between the pins should be less than 8V



To check the spark plug

- Remove the spark plug and check the tip gap. The gap is to be between 0.7-0.8 mm. Adjust if required
- Inspect the spark plug for carbon deposits. Clean if required. Replace spark plug if necessary

To check the Ignition coil

- Check connection between ignition coil and HT lead.
- Check HT cable for damages and cuts. Replace if damaged.

To check the Fuel pump and injector

- Check fuel hose from fuel pump to injector for leaks or kinks.
- Check proper functioning of injector
- Check fuel flow delivery (190ml for 3 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), and Sensor voltage not varying from <0.3V to >0.7 V (After 45 sec from engine start) you have to replace the Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) and Sensor voltage not within the specified limit (0.4 V to 0.65 V - Ignition ON and Kill ON condition) you have to replace the ECU
- If spark plug is not under specification Please change the spark plug
- If ignition coil is defective or out of specification please change the Ignition coil
- If Injector flow rate is not as per specification Please replace the injector
- If fuel pump flow rate is not as per specification Please replace the Fuel pump

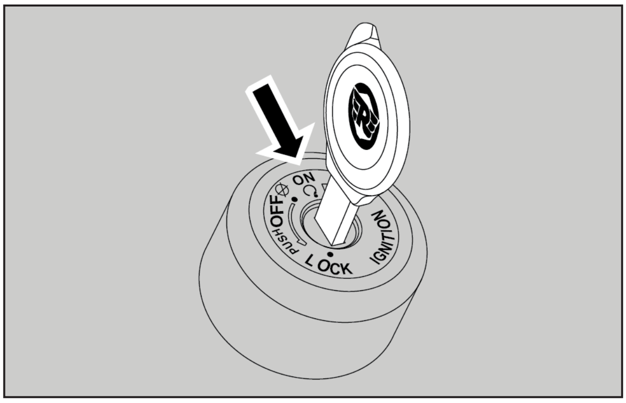
It is recommended to replace Lambda or Oxygen Sensor/ Wiring harness / ECU / Spark Plug / Ignition Coil / Injector / Fuel Pump as per the advice from Royal Enfield only.

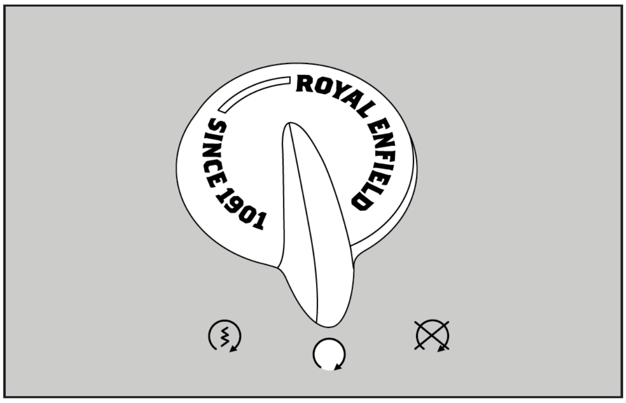
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 2191 - LAMBDA SENSOR HEATER
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P2191	Lambda Sensor Signal	Adaptive Fuel System - Too Lean At Higher Load

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Lambda Sensor is also called as Oxygen Sensor or HEGO Sensor

TROUBLE CODE : DTC CODE: P2191

Type of error : Adaptive fuel system -Too lean at higher load

(i) Information : Oxygen Sensor circuit fault / Oxygen sensor internal fault

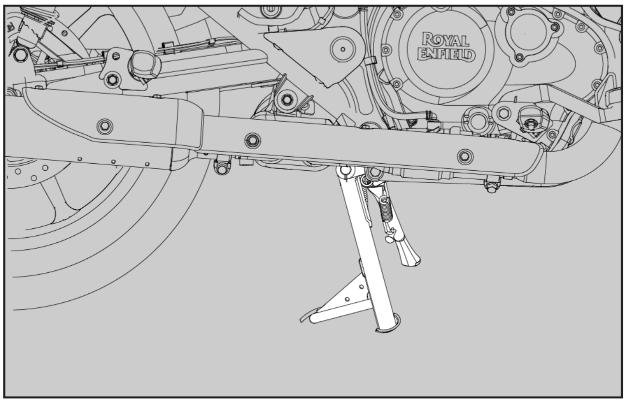
b.Preliminary Checks (Basic Check Points):

⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems

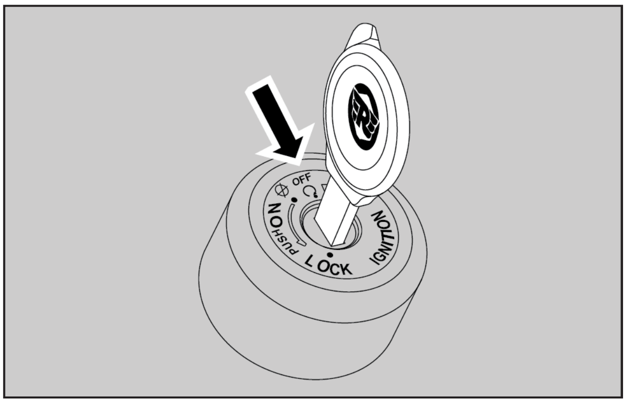
⚠ CAUTION
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

b. Pre-Checks:

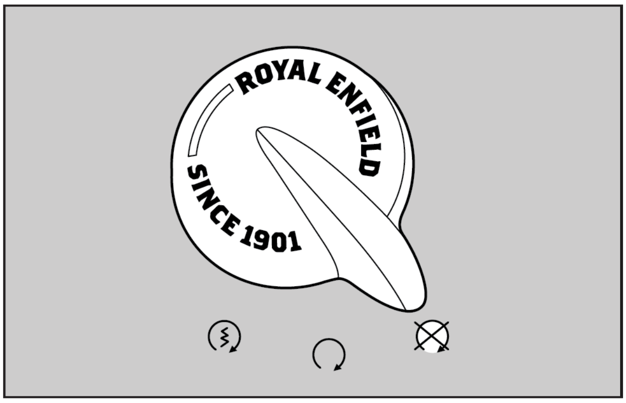
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition



- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less, please charge the battery sufficiently)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

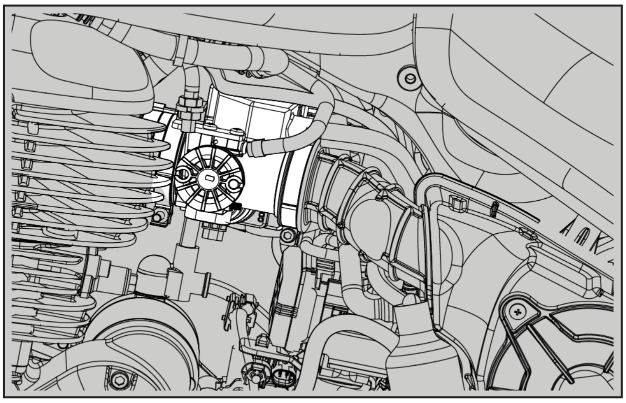
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

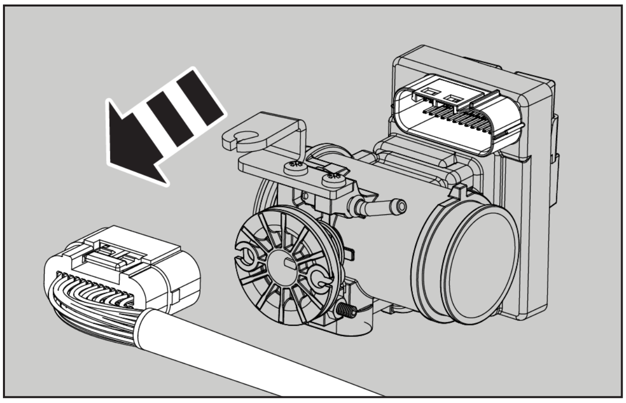
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

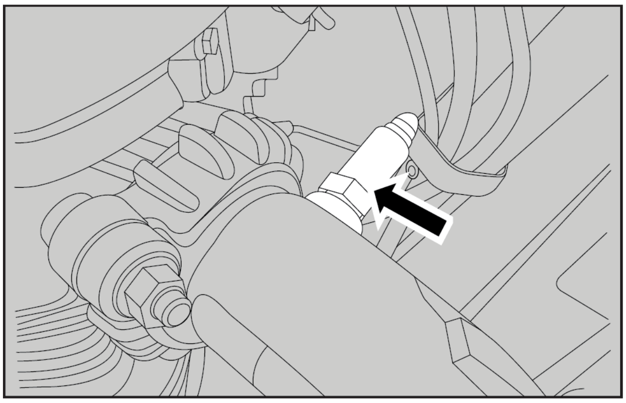
- ECU is located in the throttle body assembly



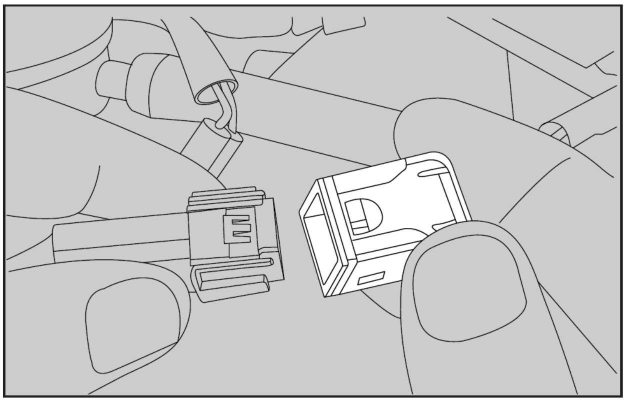
- Disconnect ECU coupler from ECU.



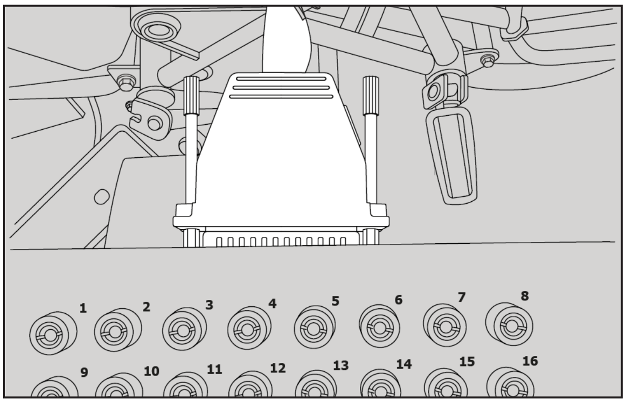
- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



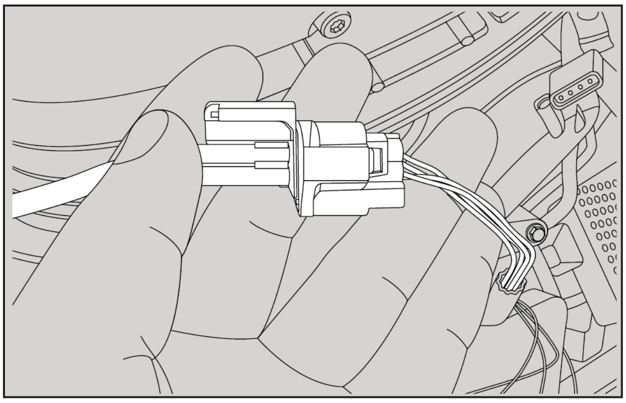
- Disconnect Oxygen /Lambda sensor coupler from the sensor wiring harness.

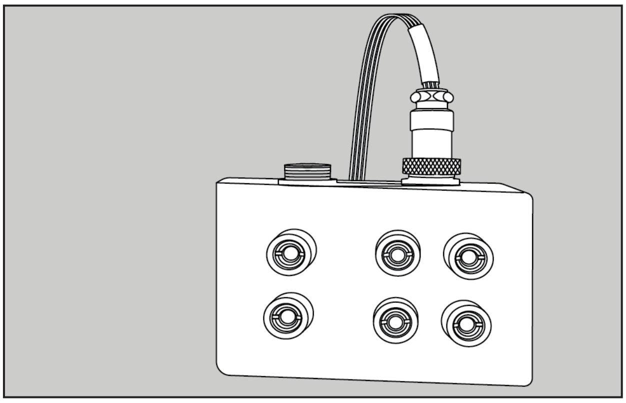


- Connect ECU Breakout box to ECU breakout box harness



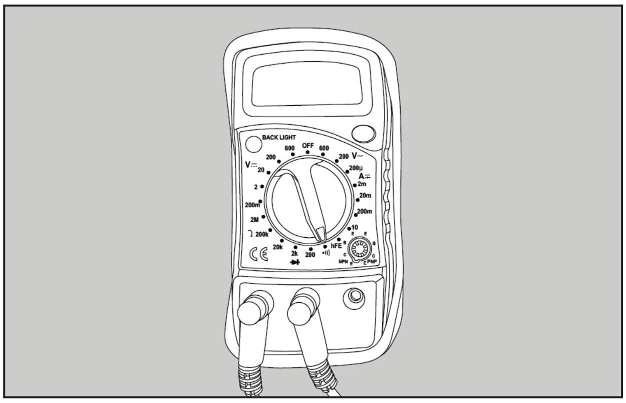
- Connect oxygen sensor breakout box harness coupler to the sensor Breakout Box (2P+4P)



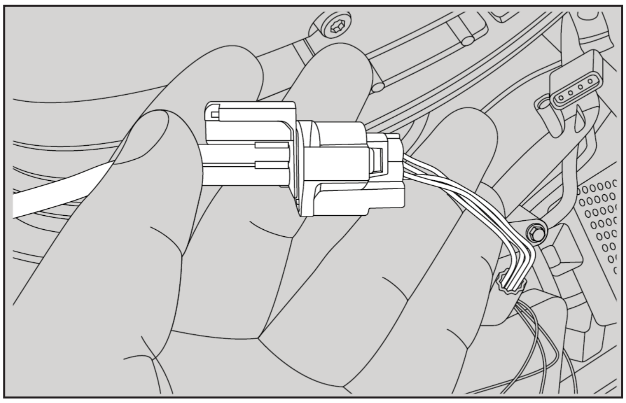


a. To check Continuity of Wiring harness

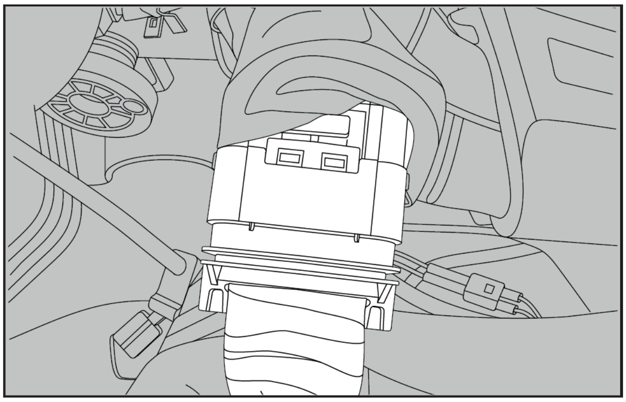
- Keep the multimeter in continuity mode



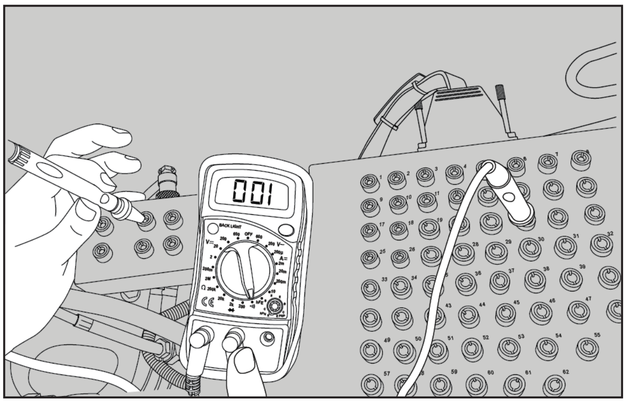
- Connect the lambda sensor breakout box harness to Lambda Sensor wiring harness coupler



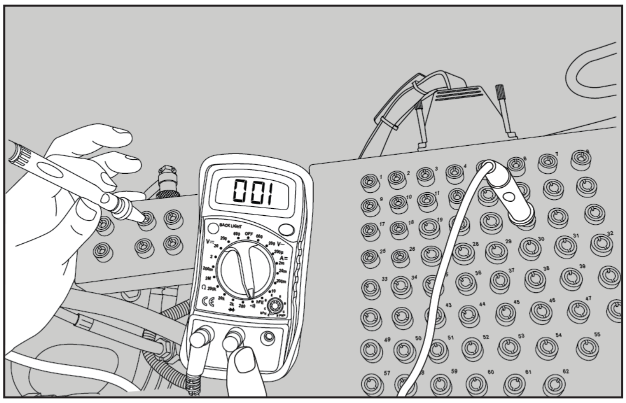
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



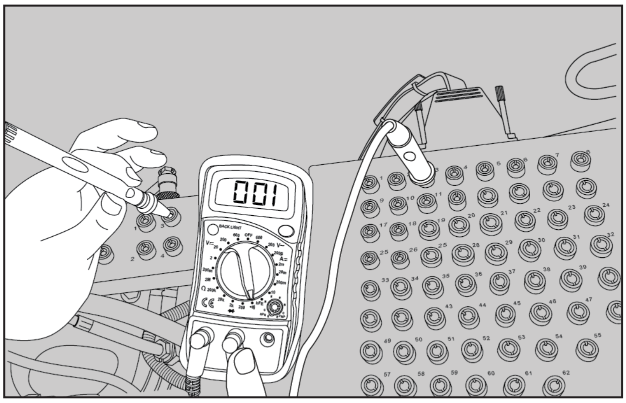
- Connect the multimeter positive probe in socket 1 of the Sensor breakout box and negative probe in socket 22 of the ECU breakout box. Check for continuity.



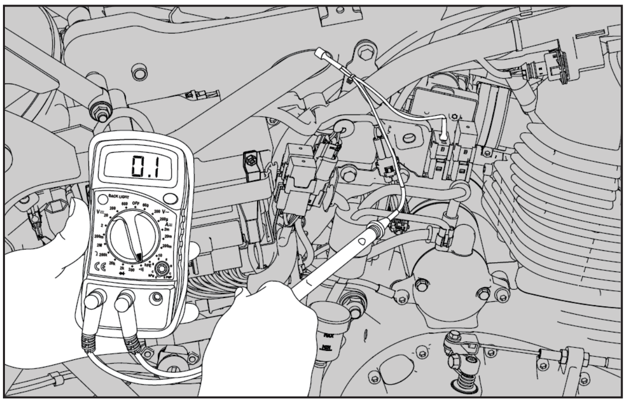
- Connect the multimeter positive probe in socket 2 of the sensor breakout box and negative probe in socket 23 of ECU breakout box. Check for continuity.

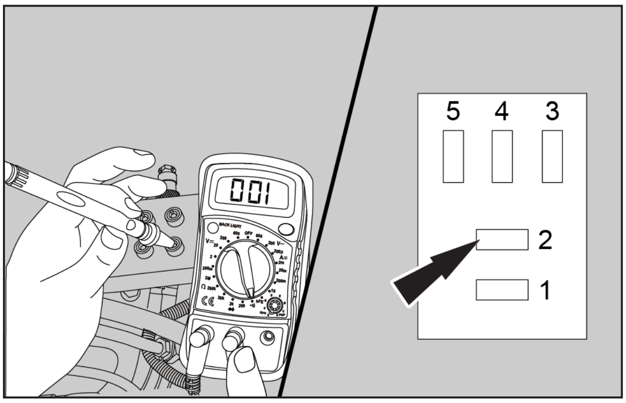


- Connect the multimeter positive probe in socket 3 of the sensor breakout box and negative probe in socket 3 of the ECU breakout box . Check for continuity.



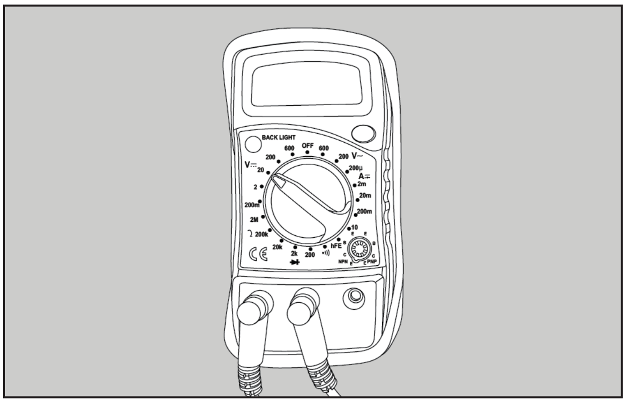
- Connect the multimeter in socket 4 of the sensor breakout box and EMS power relay pin 2



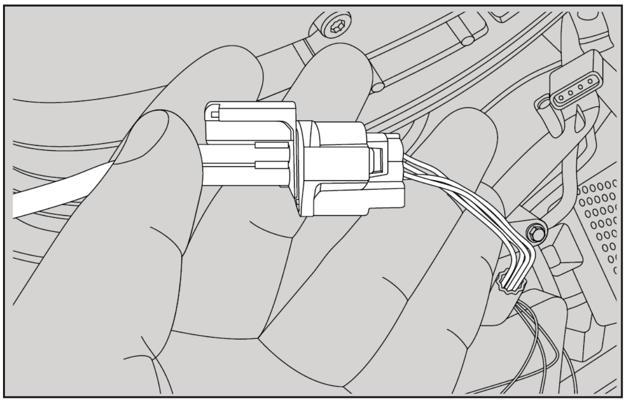


C. To check output voltage

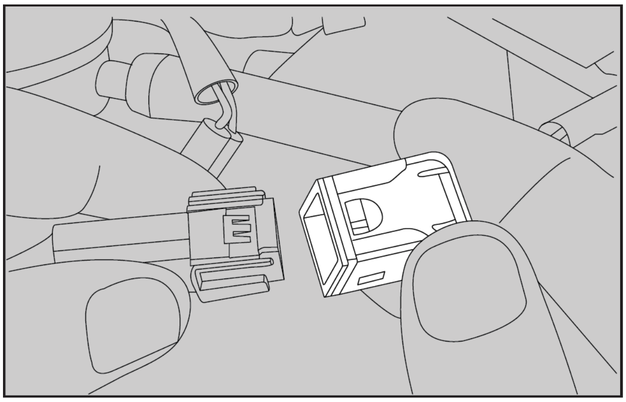
- Keep the multimeter in voltage mode (20V)



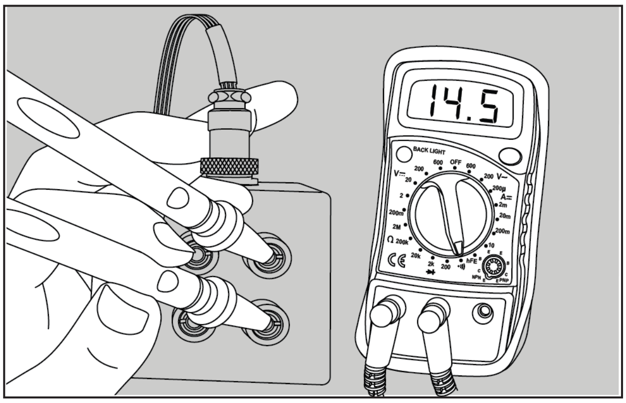
- Connect the female coupler of sensor breakout box harness to the sensor coupler.



- Ensure disconnect the male coupler of sensor breakout box harness to the sensor wiring harness coupler

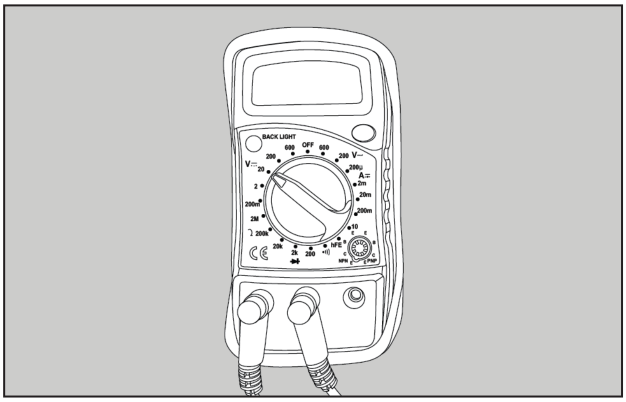


- To check the Resistance value of the O2/ Lambda sensor heater, connect the Multimeter positive probe in socket 3 and the negative probe in socket 4 of the sensor breakout box . The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

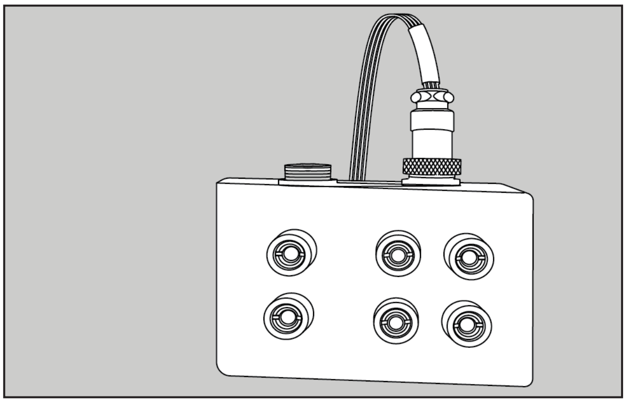


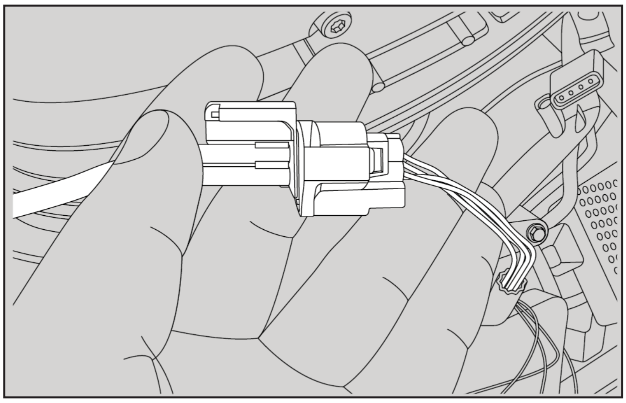
To Check the ECU (input voltage check)

- Keep the Multimeter in Voltage mode (20 V)

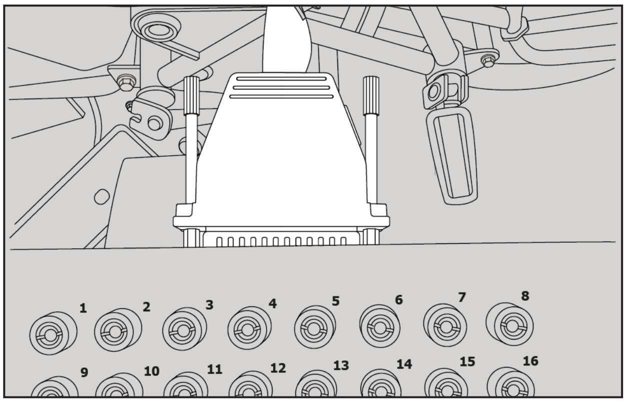


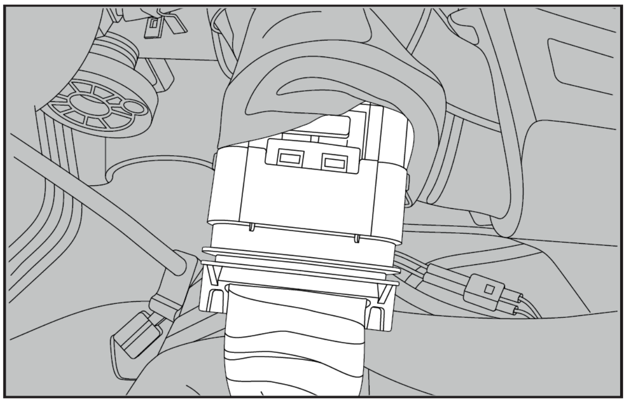
- Connect the male coupler of sensor breakout box harness to the sensor wiring harness coupler. And connect the female end of the Sensor breakout harness into the sensor coupler



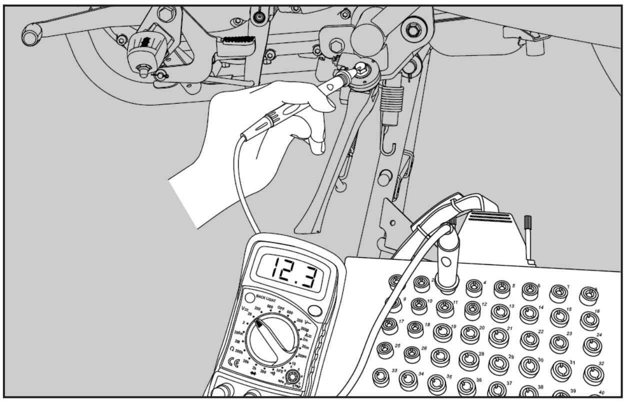


- Similarly, connect the ECU breakout box to ECU and wiring harness

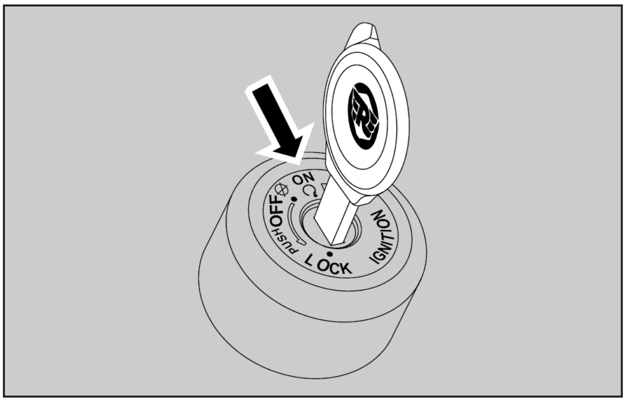


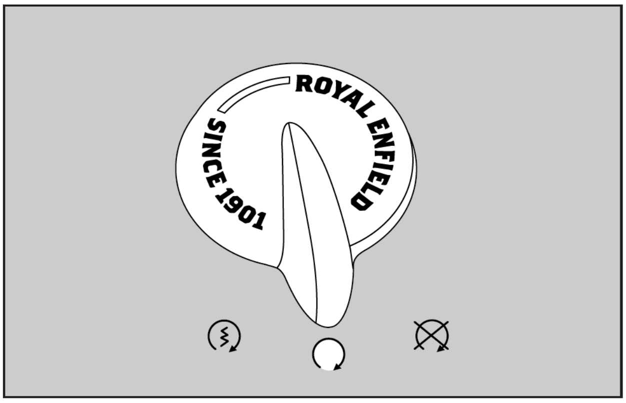


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 3 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative/Socket 1 of the ECU breakout box.

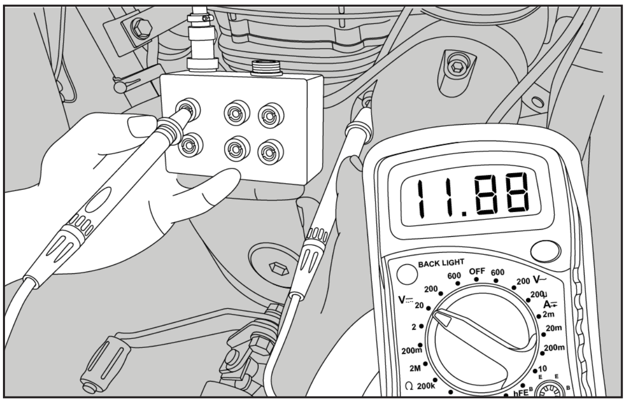


- Turn "ON" the ignition and kill switch



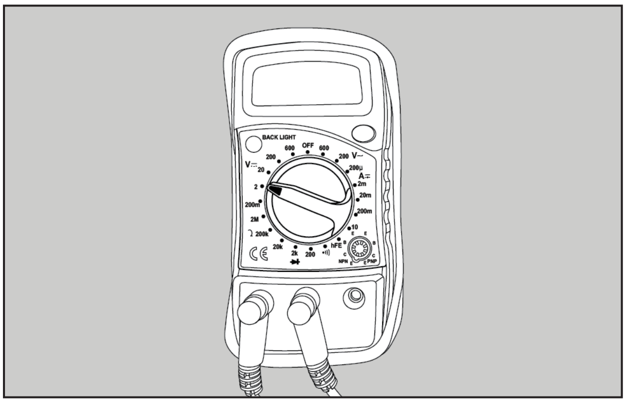


- You will be able to see the voltage of the battery and it should be 12 V in the Multimeter.

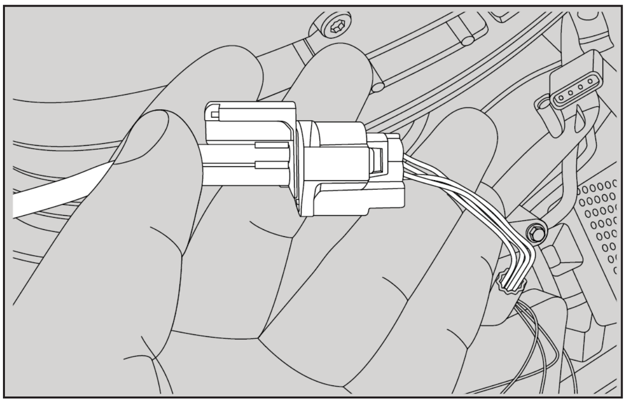


To Check output voltage check

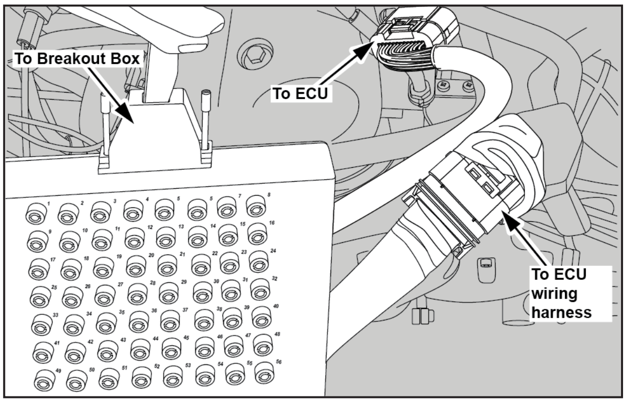
- Keep the multimeter in Voltage mode (2 V).



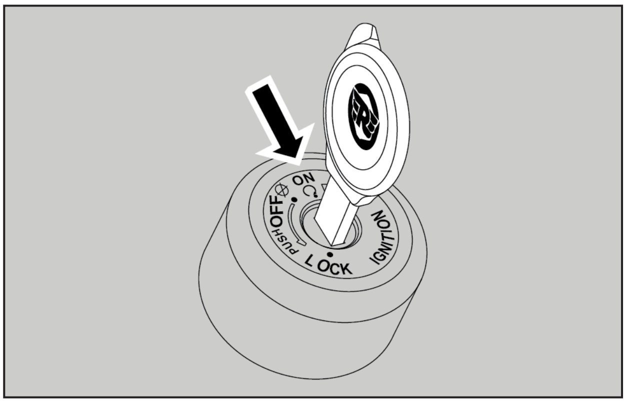
- Connect the female end of the Sensor breakout harness into the sensor coupler

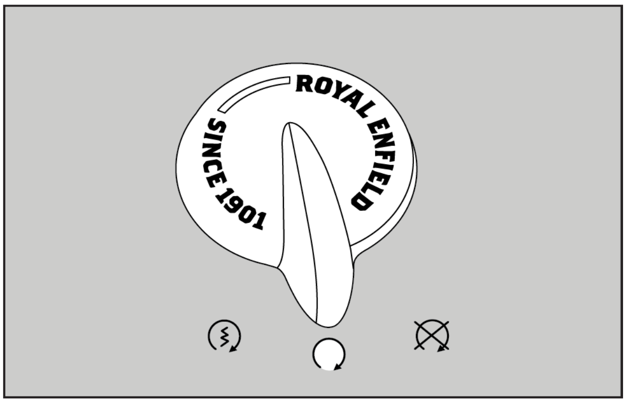


- Ensure the ECU breakout box harness is connected to ECU coupler and ECU wiring harness coupler


To Breakout Box
To ECU
To ECU wiring harness

- Turn “ON” the kill switch and ignition switch

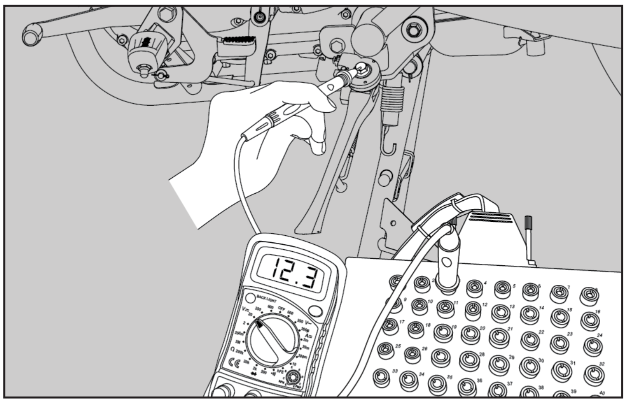

ON
OFF
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Start the vehicle and keep the vehicle in Idling RPM

A)Heater voltage check

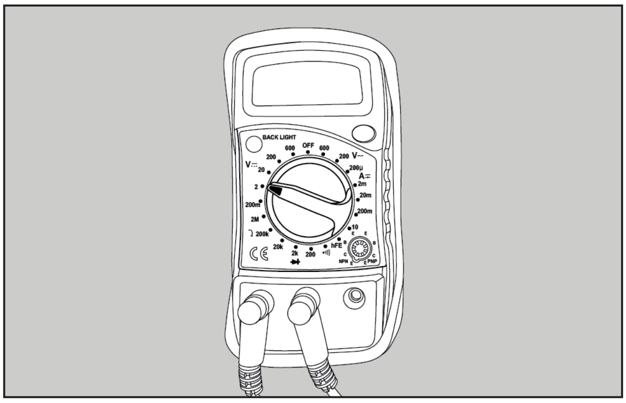
- After 45sec, check the voltage
- Keep the positive probe of the Multimeter in Socket 3 of the ECU breakout box and negative probe in body ground.
- The voltage between the pins shall be varying between 0.8V to 4V.



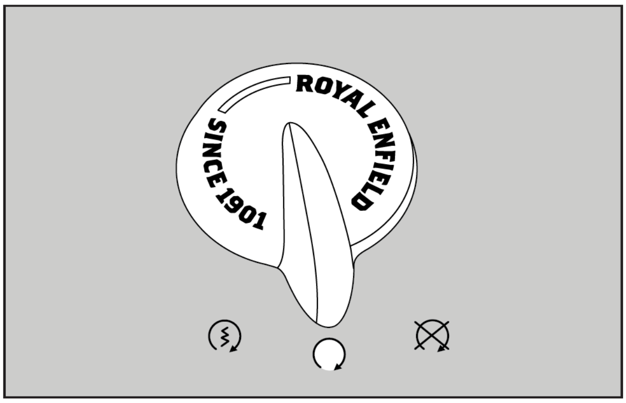
- Switch “OFF” the Engine

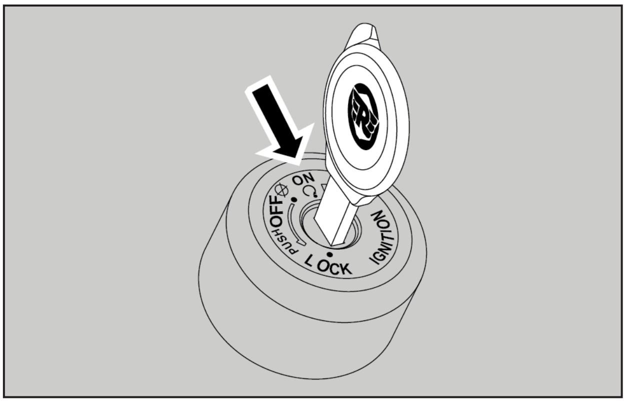
b) Sensor voltage check

- Keep the Multimeter in Voltage mode (2 V)

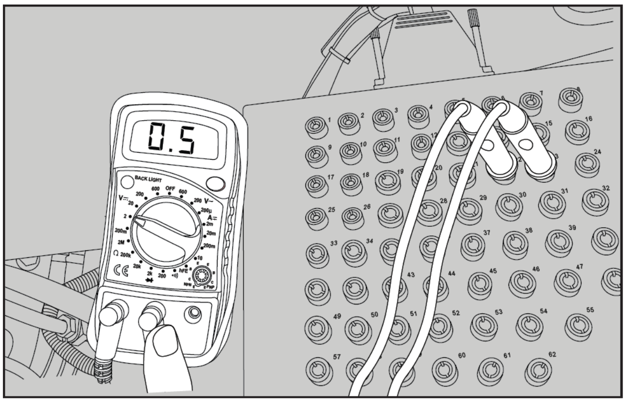

BACK LIGHT
OFF

- Turn “ON” the Ignition switch and kill switch


ROYAL ENFIELD
SINCE 1901



- Start the vehicle and keep the vehicle in Idling RPM
- After 45sec, check the voltage
- Keep the positive probe on socket 23 of the ECU breakout box and Negative probe in socket 22 of the ECU break outbox



- Voltage should be varying from <0.3V to >0.7, (Condition: During idle rpm after 30 seconds)

To check the spark plug

- Remove the spark plug and check the tip gap. The gap is to be between 0.7-0.8 mm. Adjust if required
- Inspect the spark plug for carbon deposits. Clean if required. Replace spark plug if necessary

To check the Ignition coil

- Check connection between ignition coil and HT lead.
- Check HT cable for damages and cuts. Replace if damaged.

To check the Fuel pump and injector

- Check fuel hose from fuel pump to injector for leaks or kinks.
- Check proper functioning of injector
- Check fuel flow delivery (190ml for 3 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), and Sensor voltage not varying from <0.3V to >0.7 V (After 45 sec from engine start) you have to replace the Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) and Sensor voltage not within the specified limit (0.4 V to 0.65 V - Ignition ON and Kill ON condition) you have to replace the ECU
- If spark plug is not under specification Please change the spark plug
- If ignition coil is defective or out of specification please change the Ignition coil
- If Injector flow rate is not as per specification Please replace the injector
- If fuel pump flow rate is not as per specification Please replace the Fuel pump

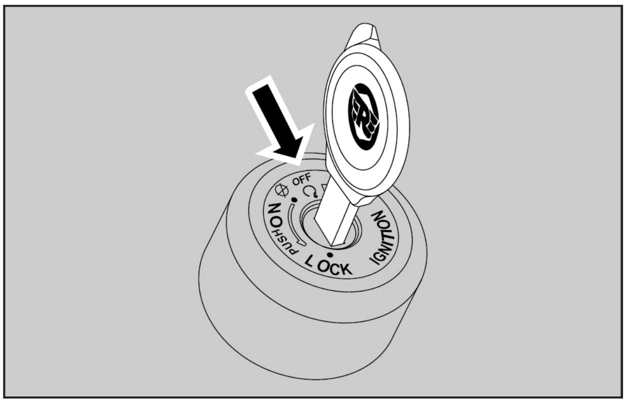
It is recommended to replace Lambda or Oxygen Sensor/ Wiring harness / ECU / Spark Plug / Ignition Coil / Injector / Fuel Pump as per the advice from Royal Enfield only.

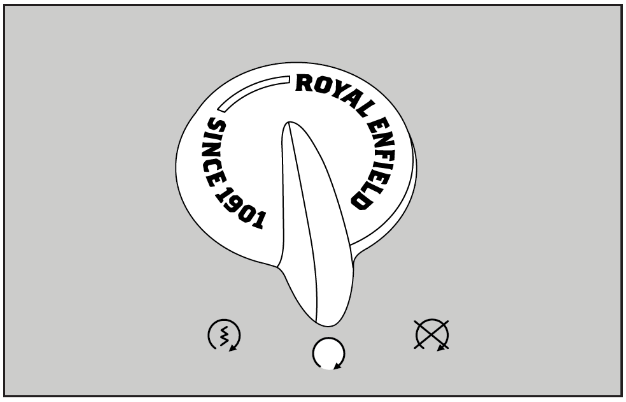
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

It is recommended to replace the oxygen sensor/ ECU / Wiring Harness/ as per the advice from Royal Enfield only.

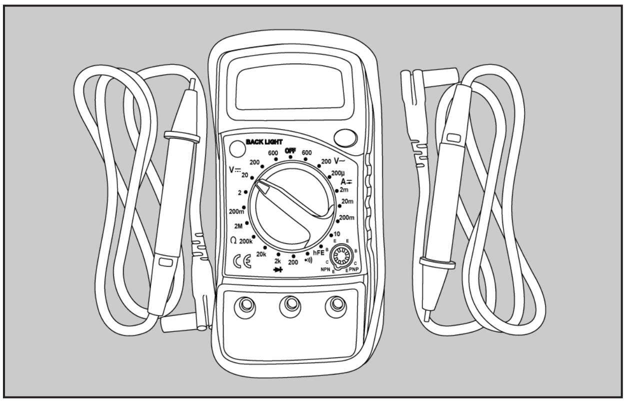
1.2. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc.**

Tools Required

- Multimeter (Universal)


BACK LIGHT
OFF
600
600
200
200
V
20
2
200m
2M
200k
20k
2k
200
hFE
A
200μ
2m
20m
200m
10
NPN
PNP

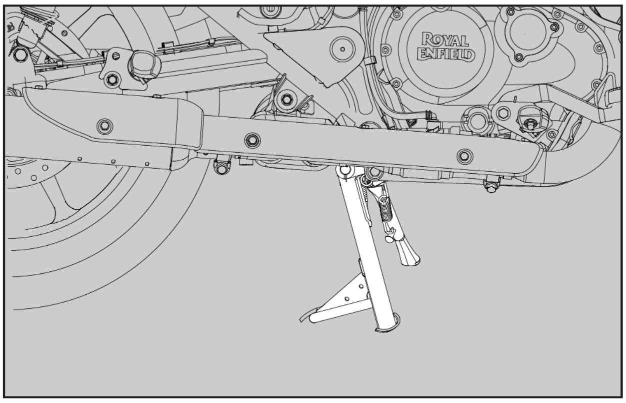
- Test lead wire (60 Series - Blue Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (Hyperlink to the table should be given here)

Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

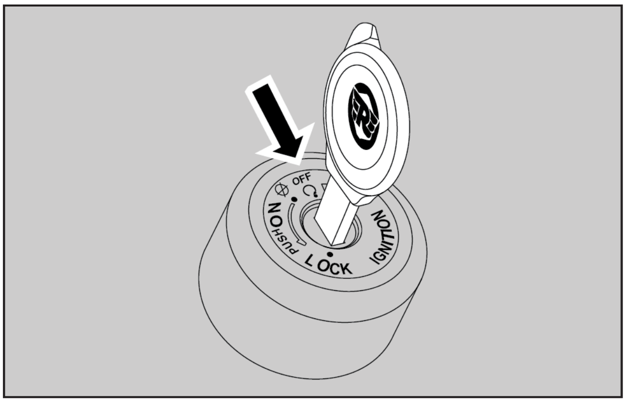
Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

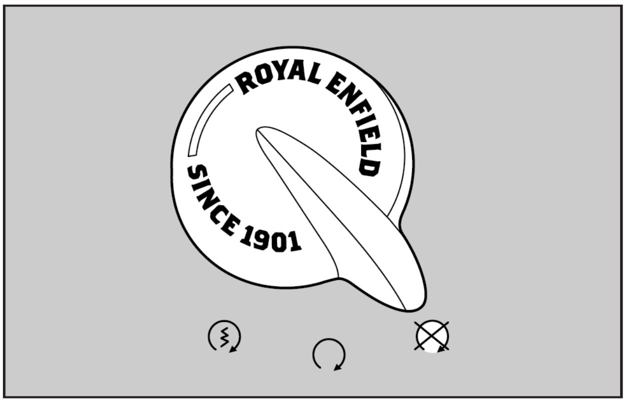
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

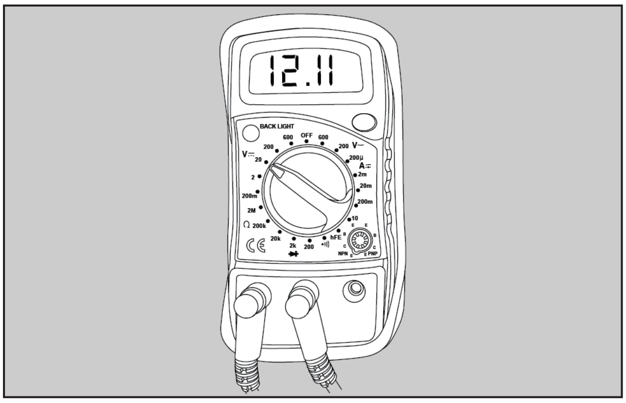


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please charge the battery sufficiently



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

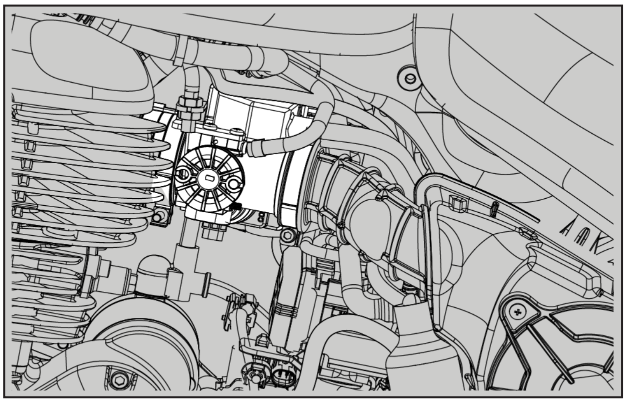
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the lambda/ oxygen sensor coupler*

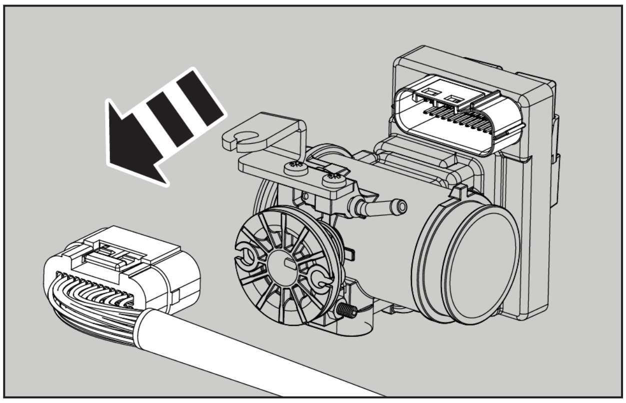
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

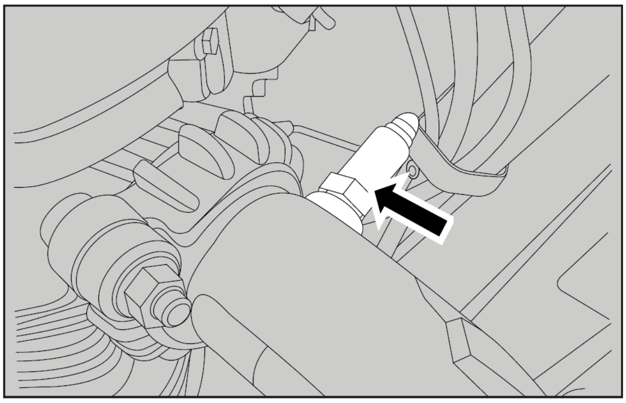
- ECU is located on the Throttle body assembly



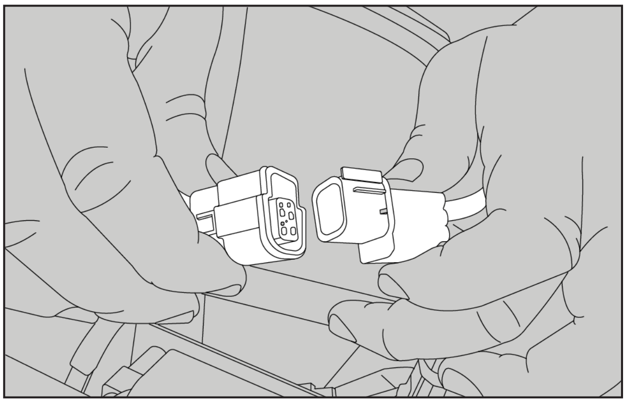
- Disconnect the ECU wiring harness coupler from ECU



- Oxygen Sensor / Lambda sensor is located on the exhaust pipe



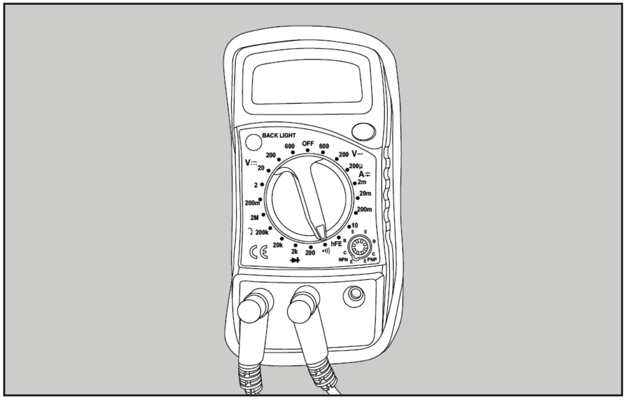
- Disconnect the oxygen sensor coupler.



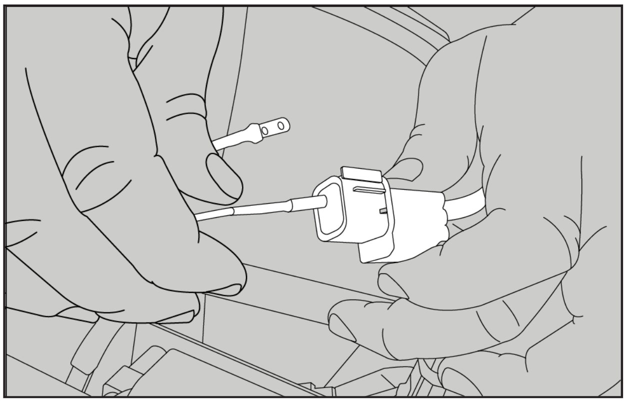
To check Continuity of the Wiring Harness

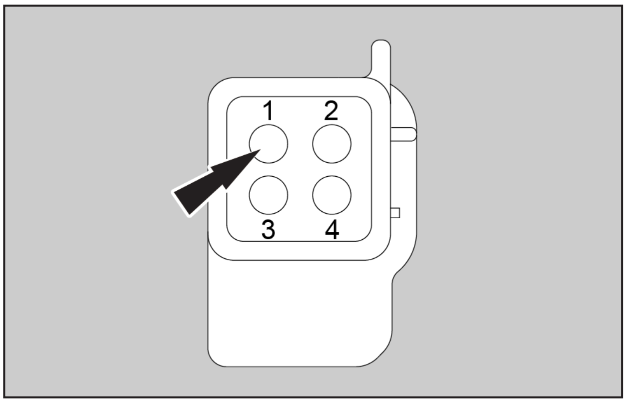
STEP 1:

- Keep the multimeter in continuity mode

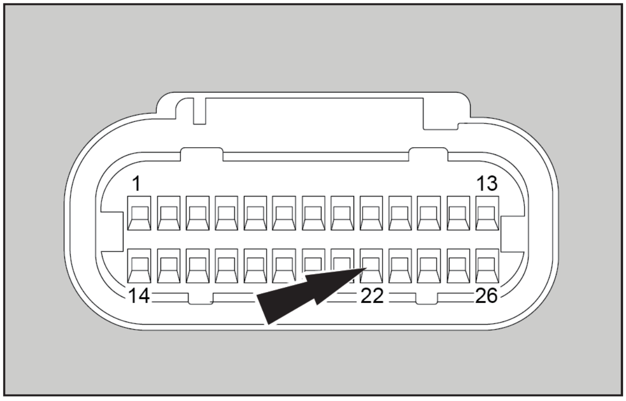


- Connect test lead wire 60 series (blue color) with the black tag to Pin 1 of the sensor wiring harness socket.

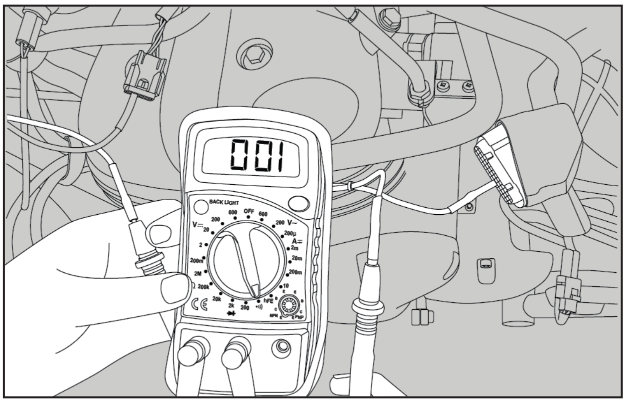




- Connect test lead wire 40 series (yellow color) with the black tag to pin 22 of the ECU harness socket.

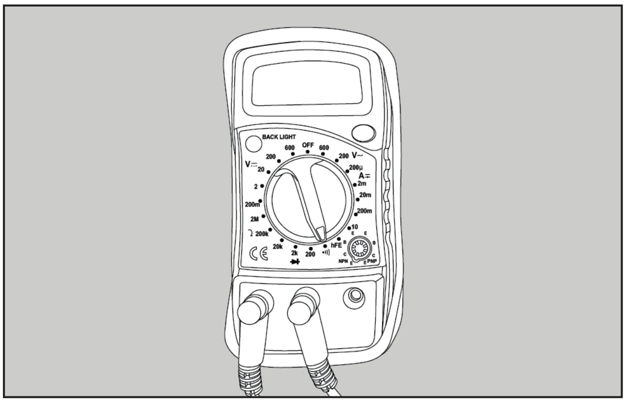


- Check for continuity (Beep Sound from the multimeter)

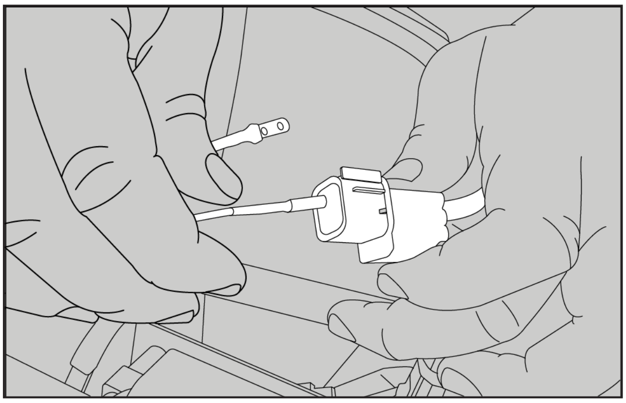


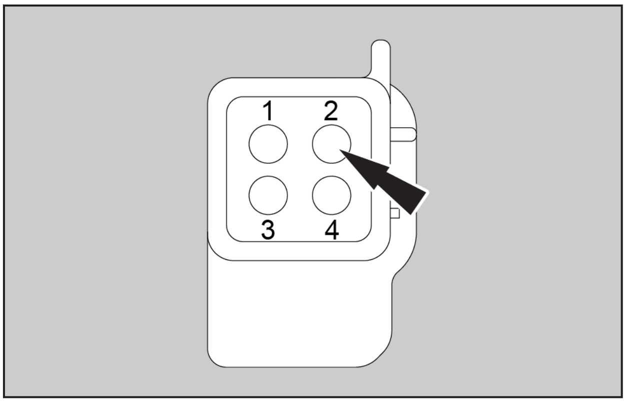
STEP2:

- Keep the multimeter in continuity mode

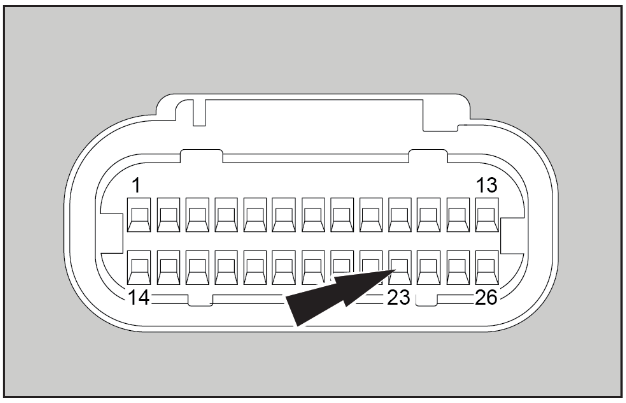


- Connect Test lead wire 60 series (blue color) with the red tag to Pin 2 of the wiring socket.

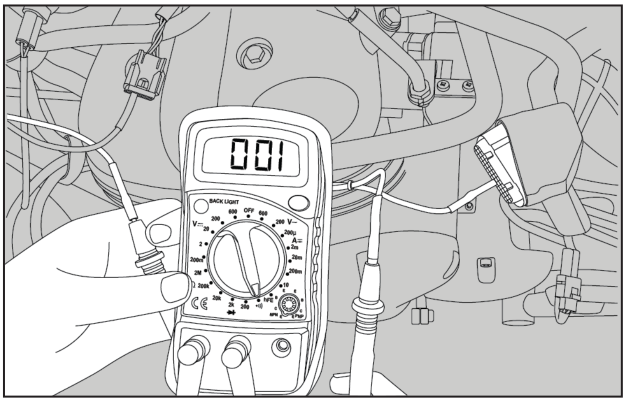




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

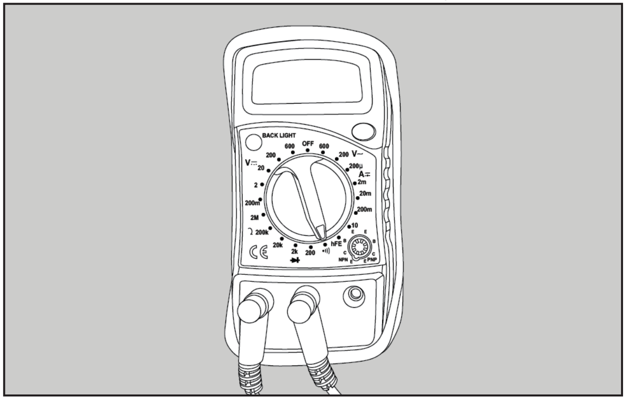


- Check for continuity (Beep Sound) from the multimeter

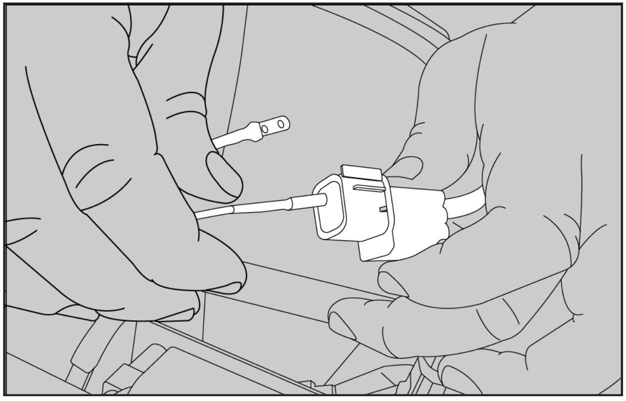


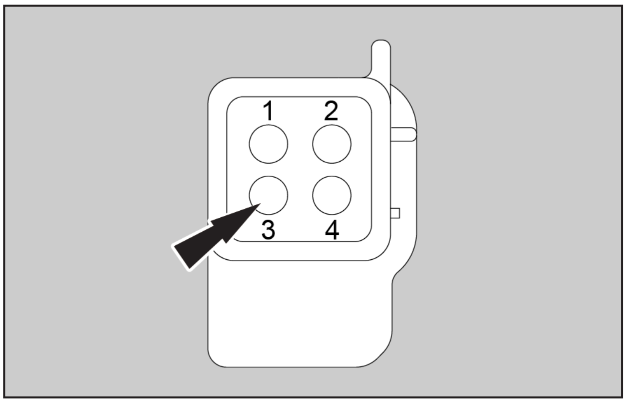
STEP 3:

- Keep the multimeter in continuity mode

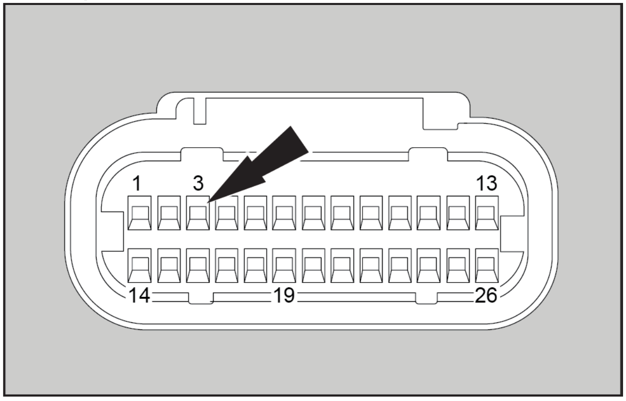

BACK LIGHT
OFF

- Connect Test lead wire 60 series (blue color) with the yellow tag to Pin 3 of the wiring socket.

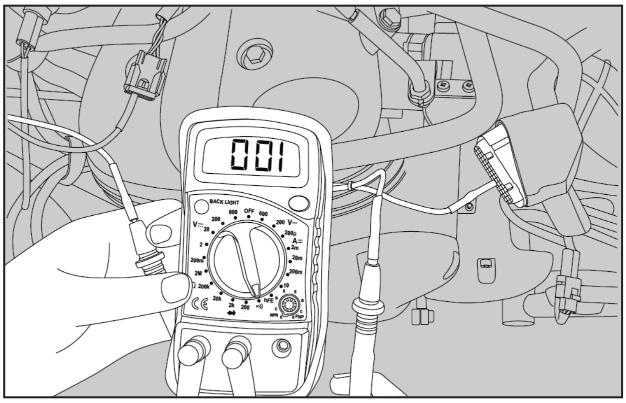




- Connect Test lead wire 40 series (yellow color) to pin 3 of the ECU socket.

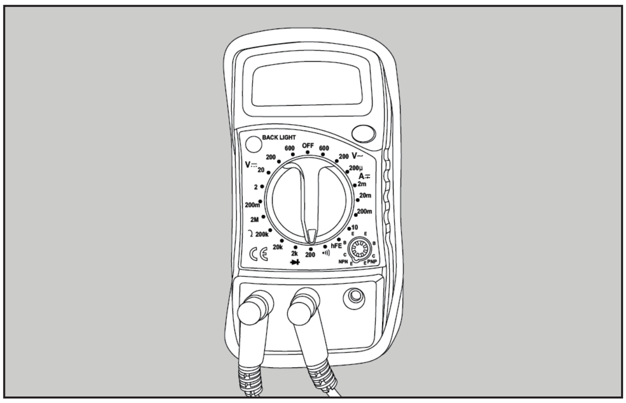

1
3
13
14
19
26

- Check for continuity (Beep Sound) from the multimeter

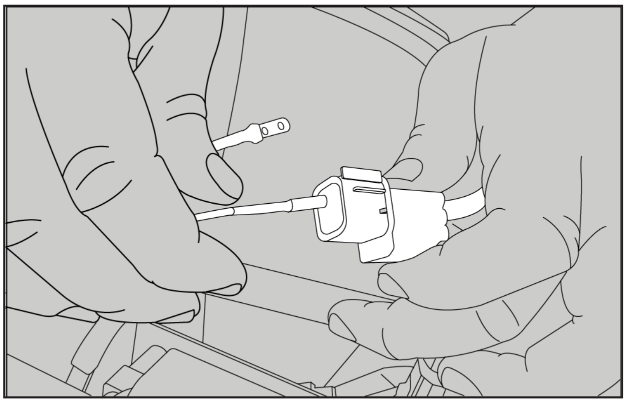

001
BACK LIGHT
OFF

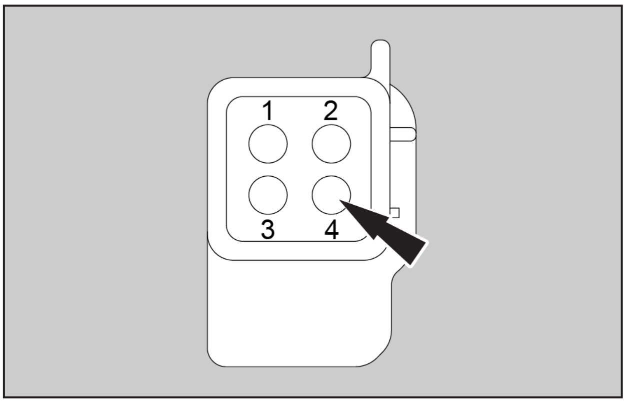
STEP 4:

- Keep the multimeter in continuity mode

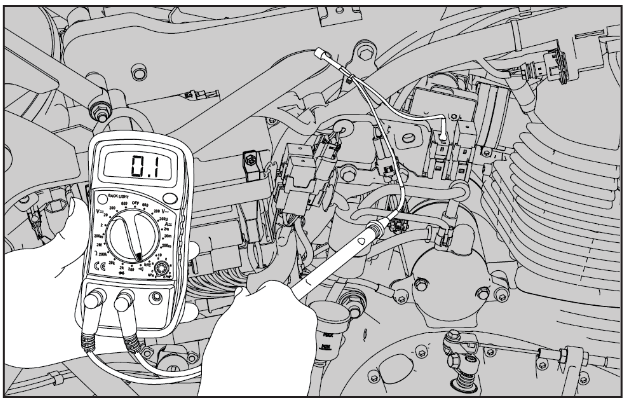

BACK LIGHT
OFF

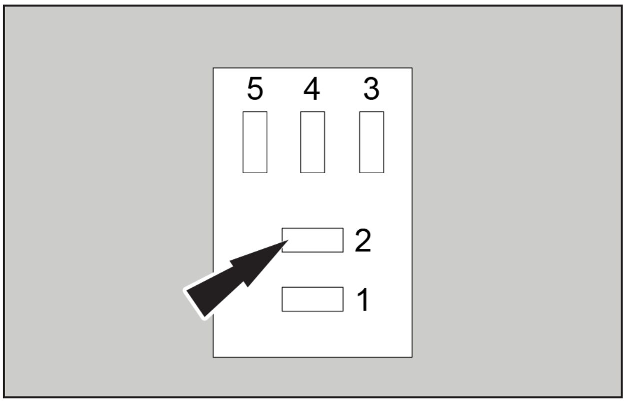
- Connect Test lead wire 60 series (blue color) with the red tag to Pin 4 of the wiring socket.



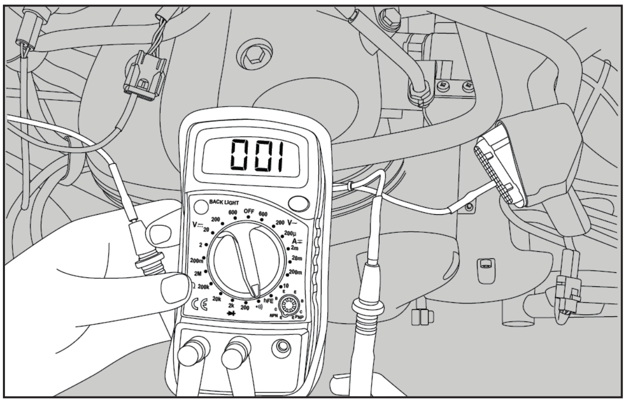


- Disconnect power relay and connect test lead wire into relay socket pin 2.





- Check for continuity (Beep Sound) from the multimeter

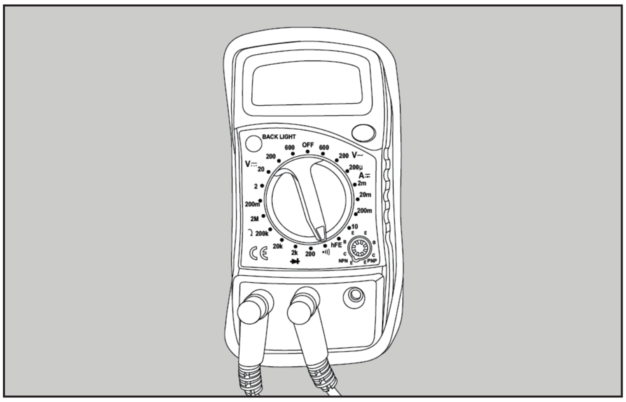


⚠ CAUTION

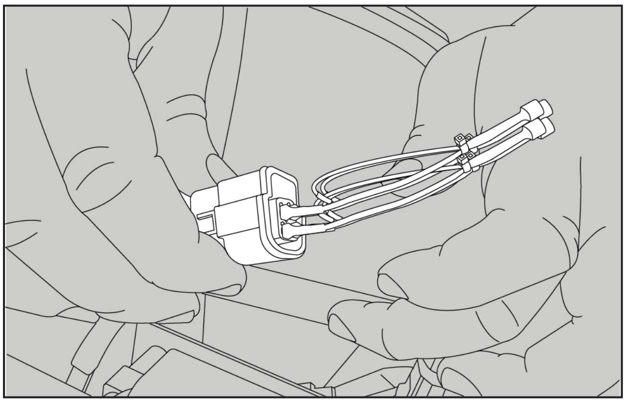
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the resistance of the sensor

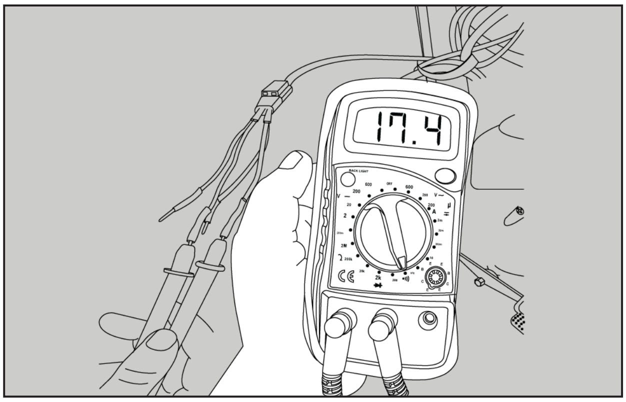
- Keep the multimeter in resistance mode (200 ohms)



- Disconnect the Test lead wire from the sensor wiring harness coupler and connect the Test lead wire 60 series to Sensor coupler.
- Sensor Pin 1 with Test lead wire 60 series (blue color) with the black tag
- Sensor Pin 2 with Test lead wire 60 series (blue color) with the red tag
- Sensor Pin 3 with Test lead wire 60 series (blue color) with the yellow tag
- Sensor Pin 4 with Test lead wire 60 series (blue color) with the green tag



- To check the Resistance value of the Lambda sensor heater, connect the Multimeter positive probe in Test lead wire 3 and negative probe in Test lead wire 4 of the sensor breakout box .The resistance value is to be 13 to17.5 Ohms @ 30 5 °C

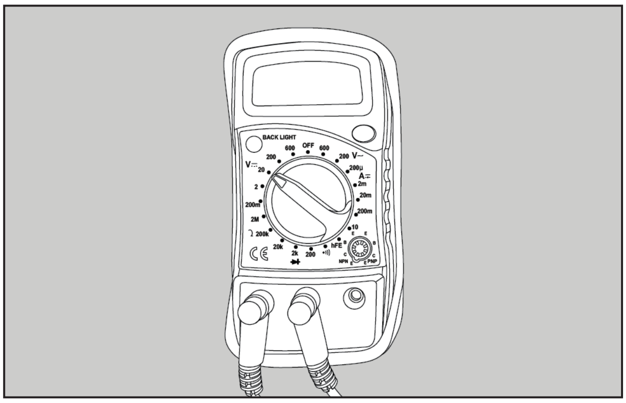


⚠ CAUTION

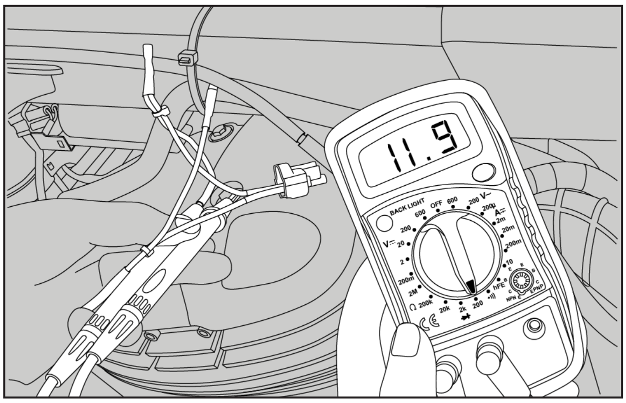
Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Input voltage:

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire 60 series (blue color) with green tag to pin 4 of sensor wiring harness coupler. Connect the multimeter positive probe to pin 4 and negative to body earth and Turn “ON” the ignition switch and kill switch. The voltage should be equal as the battery voltage (12V)

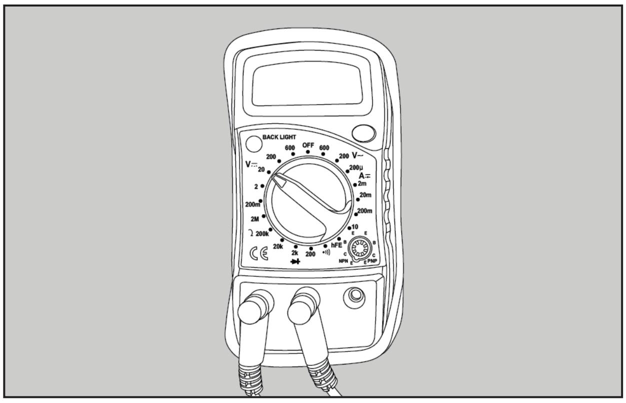


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage

To check the Output voltage

- Keep the multimeter in voltage mode (20V)



- Connect the test lead wire (60 series) in the sensor socket.

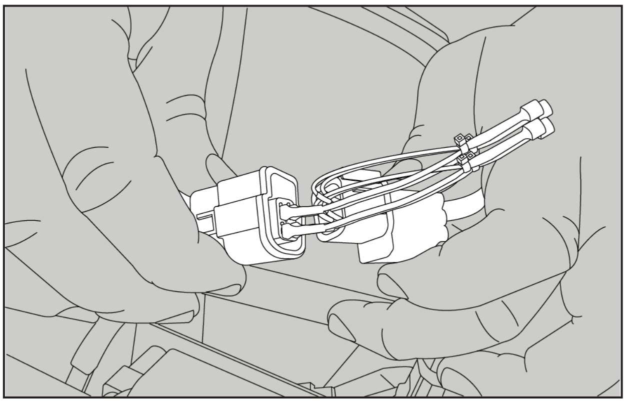
  Pin 1 with 60 series (blue color) test lead wire with black tag

  Pin 2 with 60 series (blue color) test lead wire with red tag

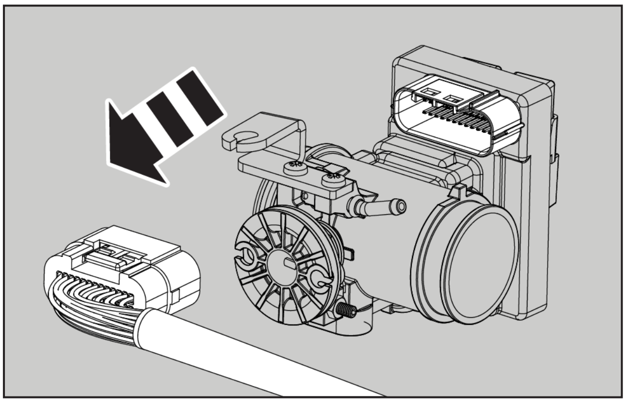
  Pin 3 with 60 series (blue color) test lead wire with Yellow tag

  Pin 4 with 60 series (blue color) test lead wire green tag

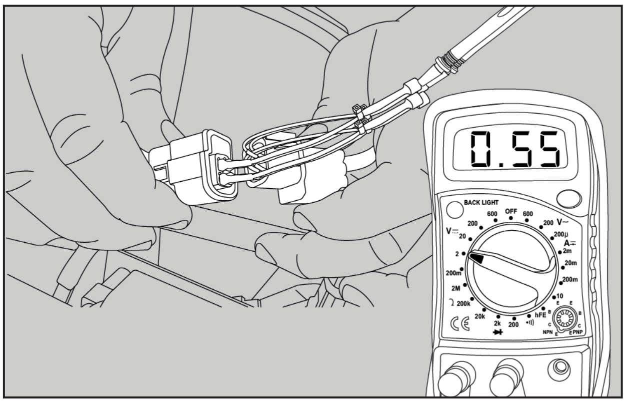
And the connect the other end of the test lead wire in the sensor wiring harness



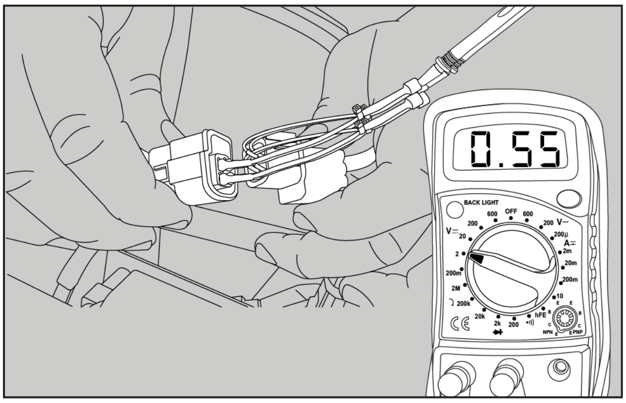
- Connect the ECU coupler to ECU



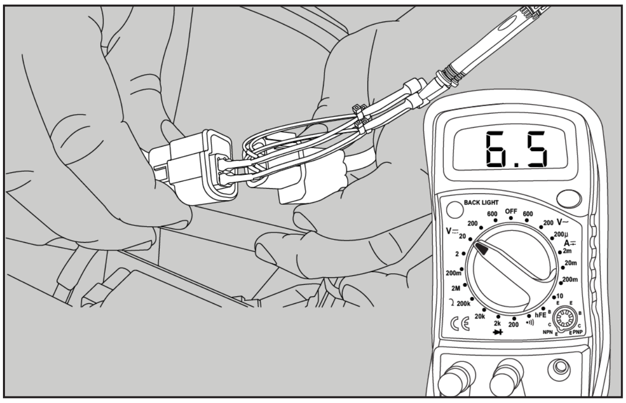
- Start the vehicle and keep the vehicle in Idling RPM
- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be between 0.4 V to 0.65 V



- Place the multimeter positive probe in pin 2 (60 series test lead wire with red tag) and Negative probe in Pin 1 (60 series test lead wire with black tag).Voltage should be from 0.1 V to 0.8 V. (After 45 Seconds)



- Place the positive probe in pin 4 (60 series blue color) test lead wire with green tag and negative probe in Pin 3 (60 series blue color test lead wire with yellow tag) . During idle rpm the voltage between the pins should be less than 8V



To check the spark plug

- Remove the spark plug and check the tip gap. The gap is to be between 0.7-0.8 mm. Adjust if required
- Inspect the spark plug for carbon deposits. Clean if required. Replace spark plug if necessary

To check the Ignition coil

- Check connection between ignition coil and HT lead.
- Check HT cable for damages and cuts. Replace if damaged.

To check the Fuel pump and injector

- Check fuel hose from fuel pump to injector for leaks or kinks.
- Check proper functioning of injector
- Check fuel flow delivery (190ml for 3 seconds)

d. DECISION POINT:

- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (13.5 to 17.5 Ohms), and Sensor voltage not varying from <0.3V to >0.7 V (After 45 sec from engine start) you have to replace the Lambda/ Oxygen Sensor
- If the heater output voltage is not within the specified limit (0.8V to 4V - After 45 sec from engine start) and Sensor voltage not within the specified limit (0.4 V to 0.65 V - Ignition ON and Kill ON condition) you have to replace the ECU
- If spark plug is not under specification Please change the spark plug
- If ignition coil is defective or out of specification please change the Ignition coil
- If Injector flow rate is not as per specification Please replace the injector
- If fuel pump flow rate is not as per specification Please replace the Fuel pump

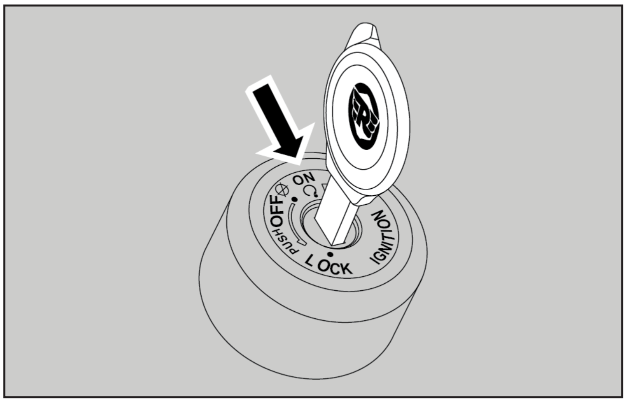
It is recommended to replace Lambda or Oxygen Sensor/ Wiring harness / ECU / Spark Plug / Ignition Coil / Injector / Fuel Pump as per the advice from Royal Enfield only.

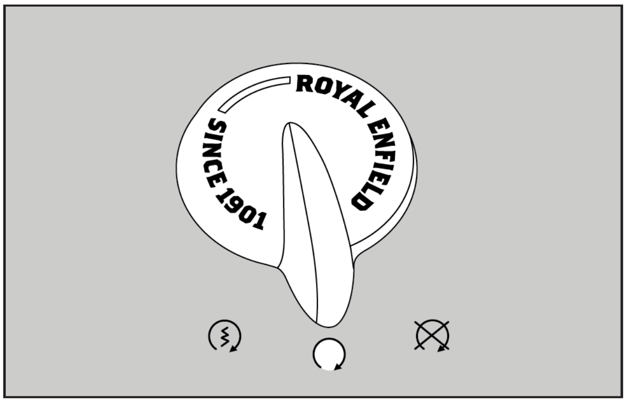
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P 0262 - INJECTOR VALVE
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. LIST OF DTC CODES (P CODES)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0262	Fuel Injector / Injector valve	Cylinder 1 Injector Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Fuel injector is also called as Injector valve

TROUBLE CODE : DTC CODE: P0262

Type of error : Cylinder 1 injector Circuit high

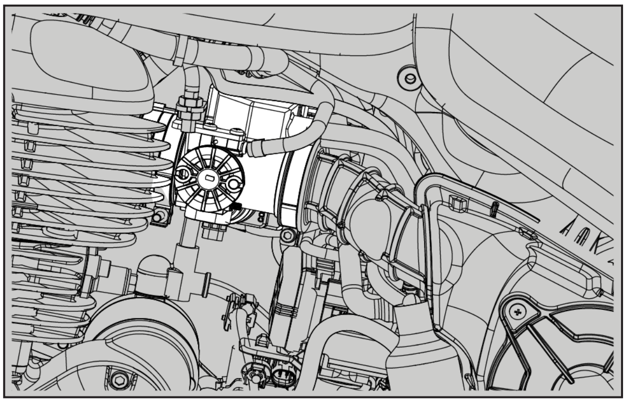
(i) Information : Injector valve circuit fault / Injector valve internal fault (Suggested Simple Description)

b.Preliminary Checks (Basic Check Points):

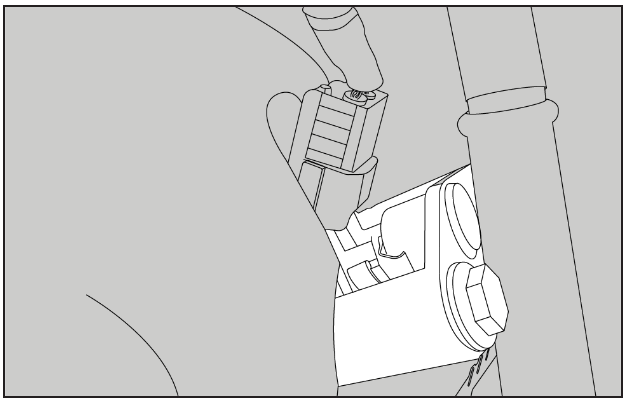
⚠ WARNING
Fuel Injector creates high pressure jets which can cause injury if exposed to the human body and also will cause damage to the painted surface

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

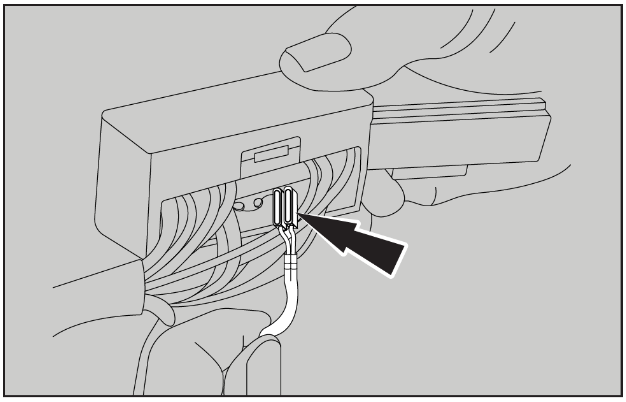
- ECU is located on the throttle body assembly



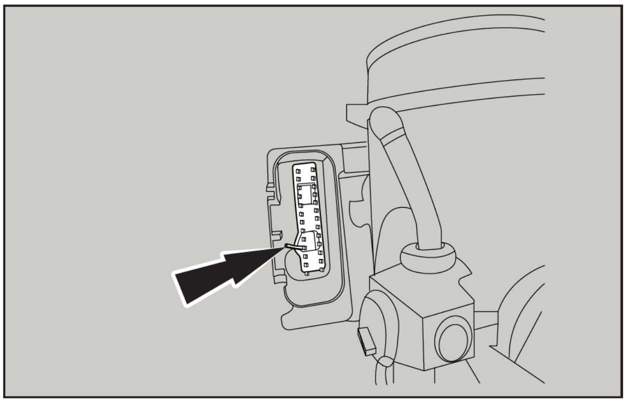
- The Injector is located on the intake manifold



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again.



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

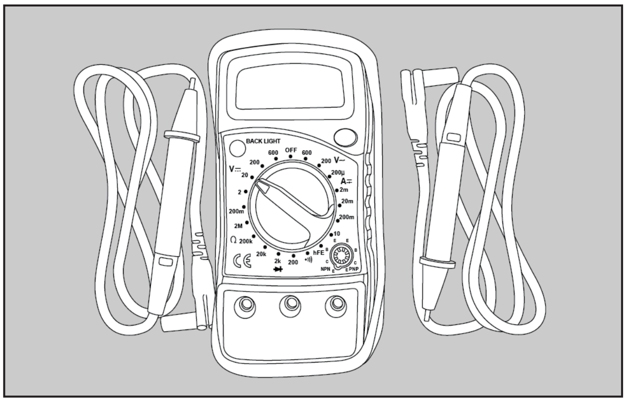
1.2 - Using Breakout Box method

1.3 - Using Test lead wire method

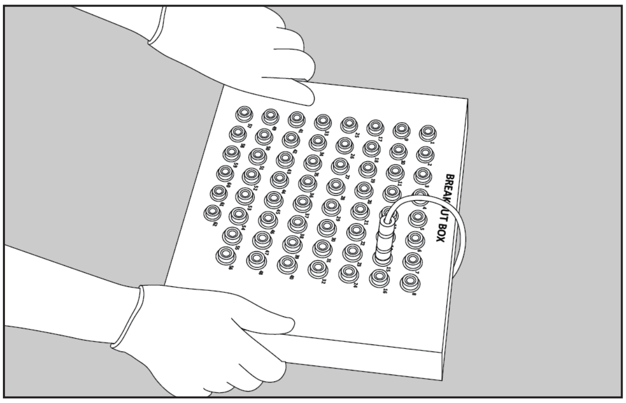
1.2. USING BREAKOUT BOX METHOD

Tools Required

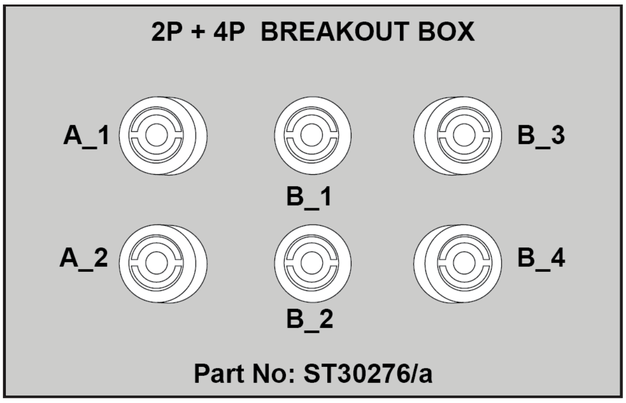
- Multimeter (Universal)



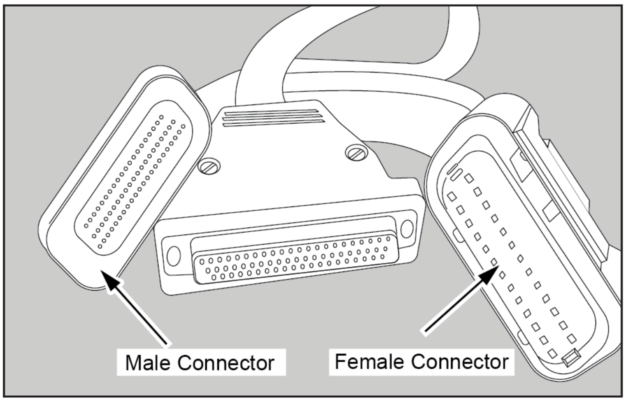
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

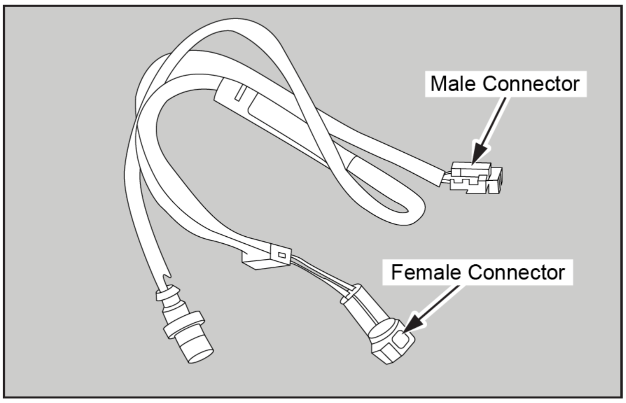
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

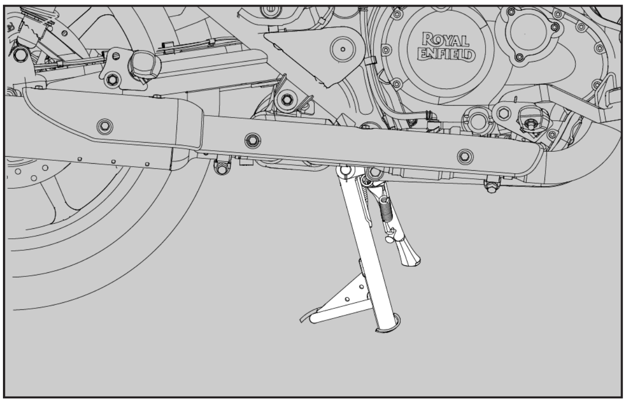

Male Connector
Female Connector

- Injector -2 Pin ST 30278/A -Sensor breakout box harness

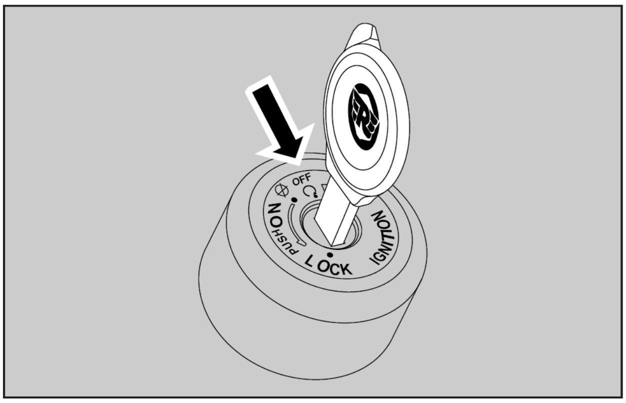

Male Connector
Female Connector

b. Pre-Checks:

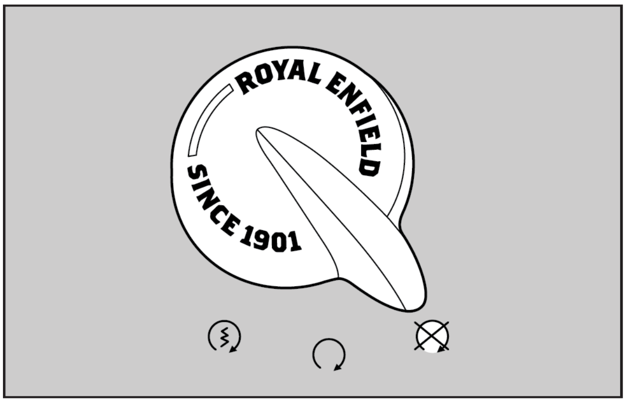
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)
- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

Fuel Injector creates high pressure jets which can cause injury if exposed to the human body and also will cause damage to the painted surface

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

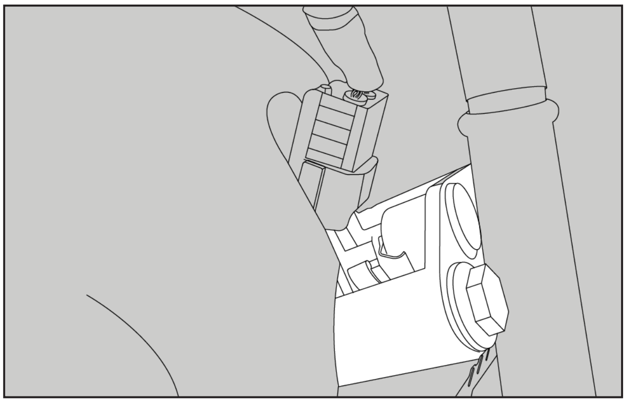
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Injector valve coupler*

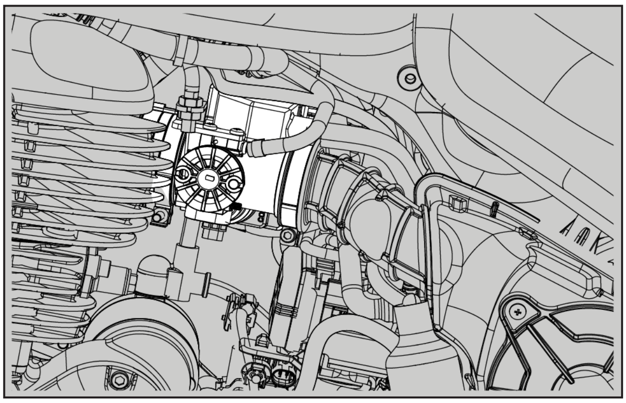
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

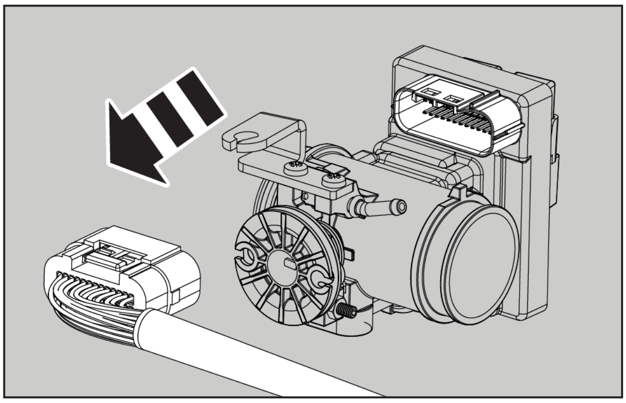
- Injector valve is located on the intake manifold



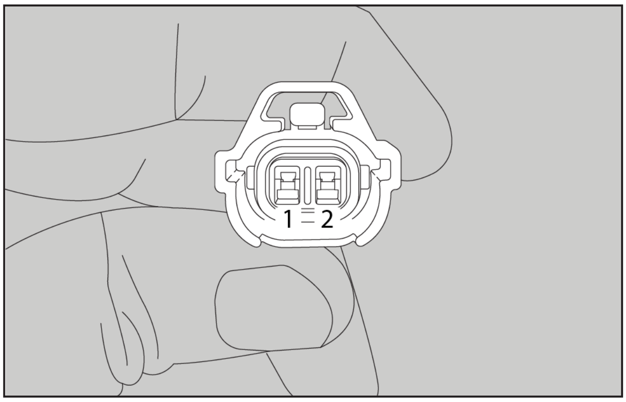
- ECU is located on the throttle assembly



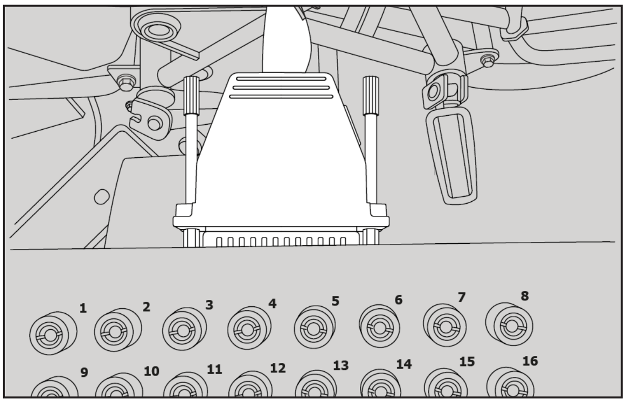
- Disconnect ECU from ECU coupler.



- Disconnect Injector valve coupler .



- Connect ECU breakout box harness to ECU breakout box (62 pin)


1
2
3
4
5
6
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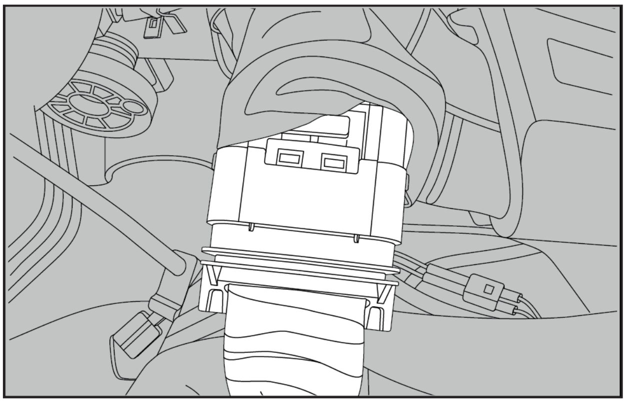
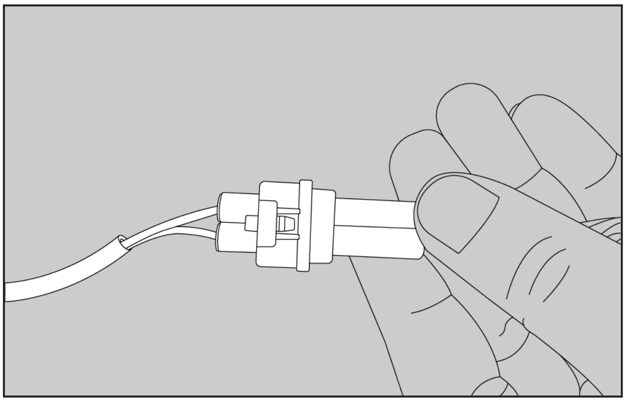
15
16

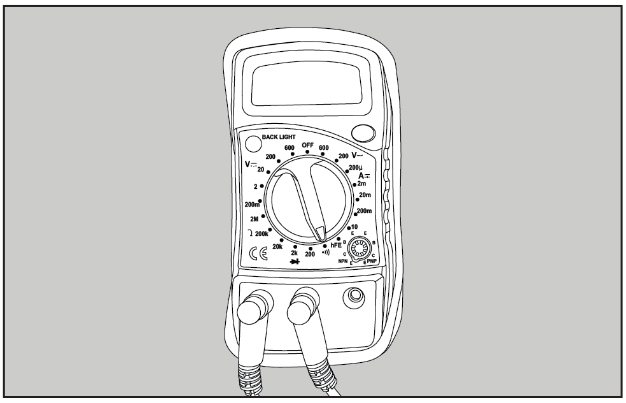


- Connect injector breakout box harness to sensor Breakout Box (2P+4P Pin)

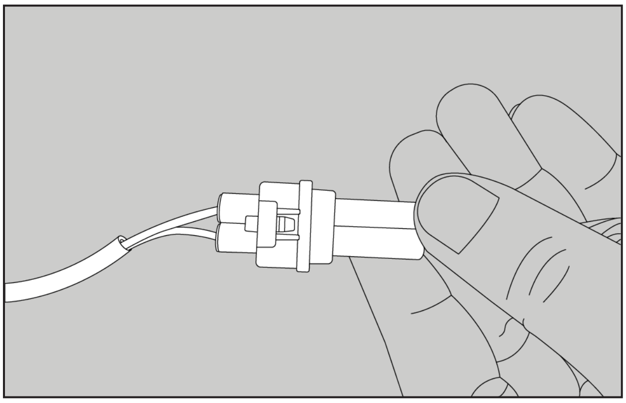


a. To check Continuity of Wiring harness

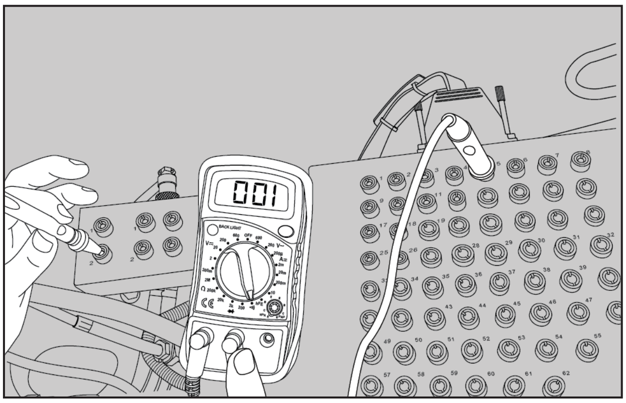
- Keep the multimeter in continuity mode


BACK LIGHT
OFF
600
200
V⎓
A⎓
200m
2M
200k
20k
2k
200
hFE
NPN
PNP

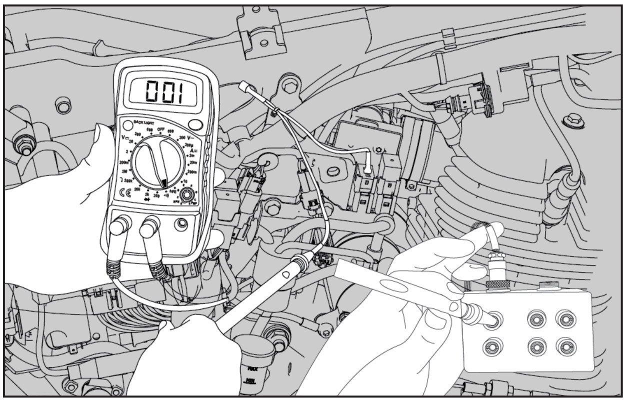
- Connect the injector breakout box harness to injector wiring harness coupler



- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 5 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

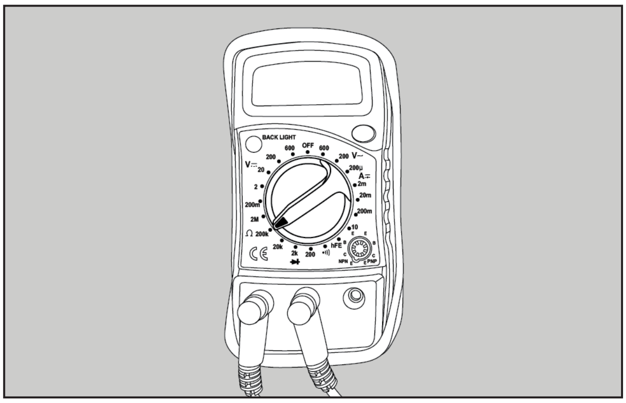


- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in pin 2 of the power relay. Check for continuity (Beep sound from the multimeter)

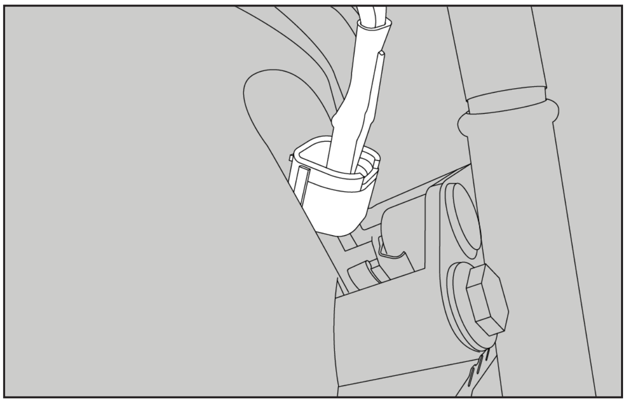


To Check Resistance of Injector valve

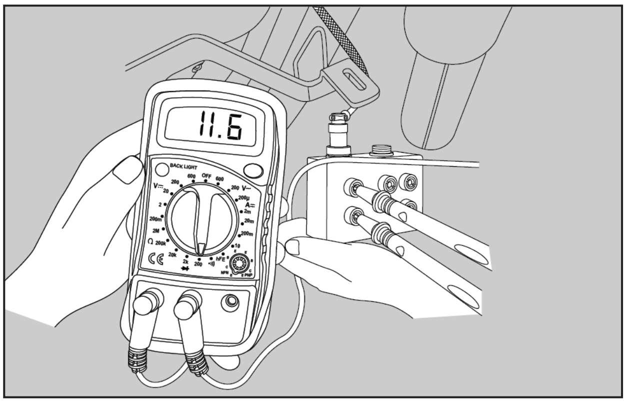
- Keep the multimeter in Resistance mode (200 Ohms)



- Connect the injector breakout box harness to Injector valve coupler

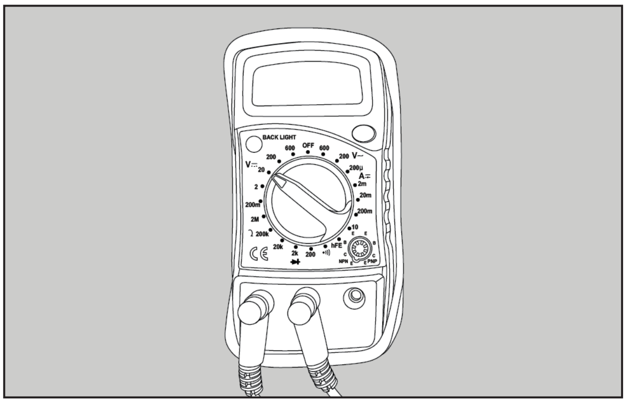


- To check the Resistance value of fuel Injector, connect the positive probe multimeter in socket 1 and negative probe socket 2 of the sensor breakout box. The resistance value is to be 11.4 to 12.6 Ohms @ 30+5°C

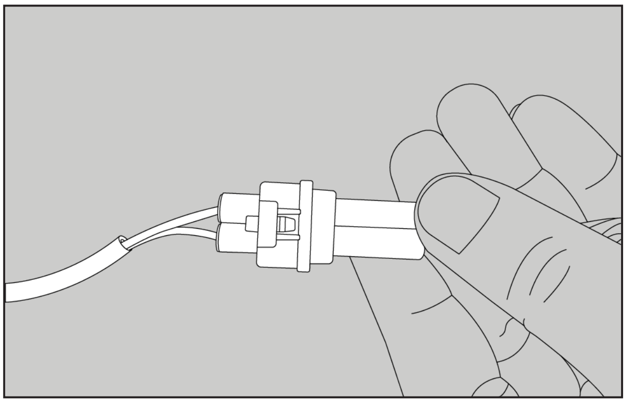


To check the input voltage

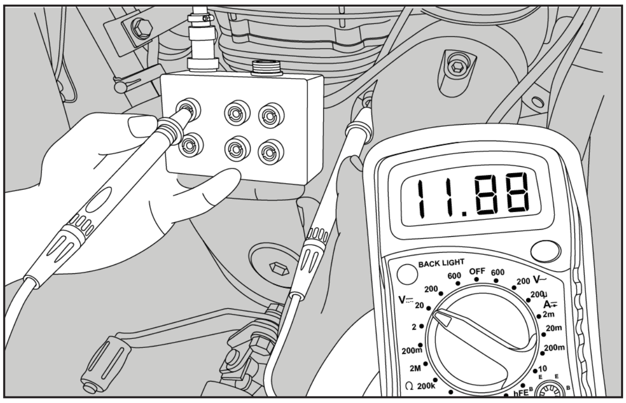
- Keep the multimeter in Voltage mode



- Connect the injector valve wiring harness coupler to Injector breakout box harness



- To check voltage at the wiring kit end, place the positive probe of the multimeter in socket 1 of the fuel Injector and place the negative probe of the multimeter to body ground. Turn "ON" the ignition and kill switch and the voltage should be battery voltage (12 V).



d. DECISION POINT:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (11.4 to 12.6 Ohms), you replace with Injector
- If the input voltage is meeting the specified limit and the resistance is within the specified limit and if continuity is available then you have to replace the ECU

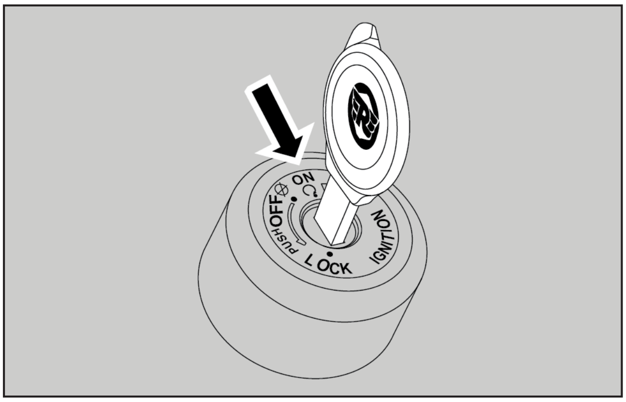
It is recommended to replace the injector /ECU/ Wiring harness as per the advice from Royal Enfield only

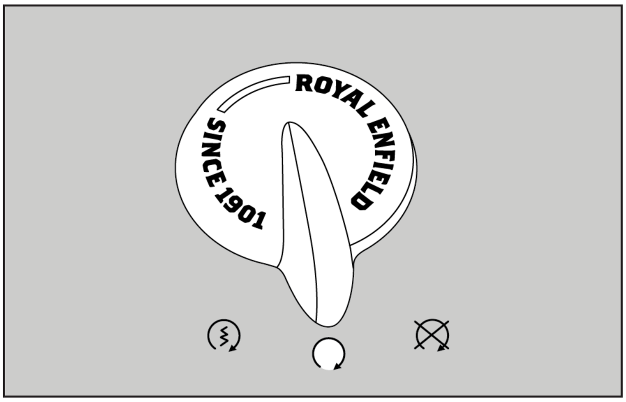
1.3. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





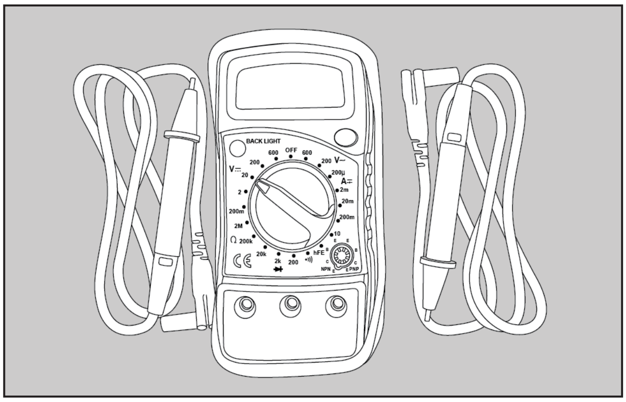
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

1.3.1. Test lead wire method :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **only to be used while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation any voltage fluctuation**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

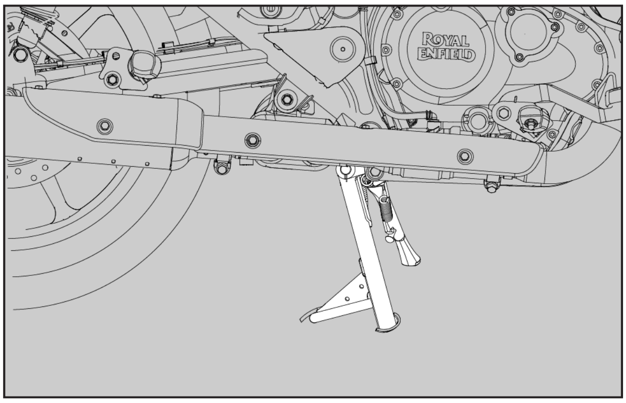


- Test lead wire (90 SERIES - Orange Color Wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins (hyperlink to be placed here)

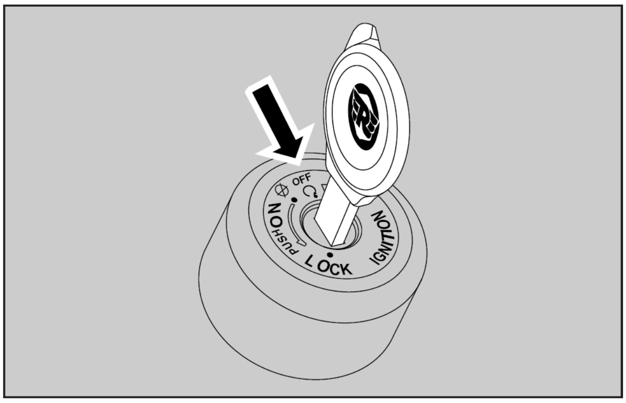
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

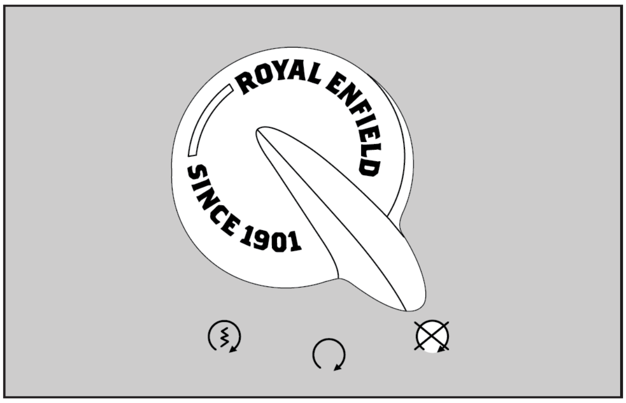
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

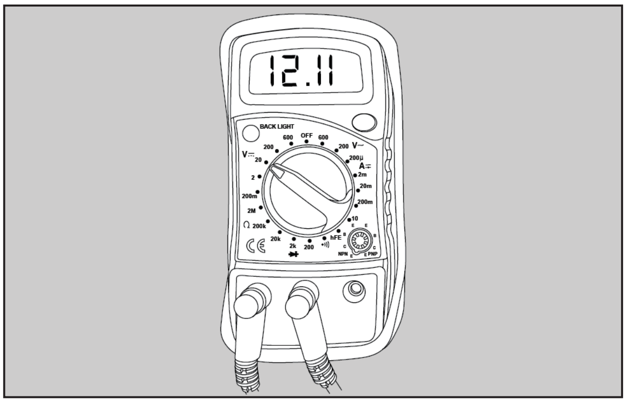


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



C. DIAGNOSTICS:

⚠ WARNING

Fuel Injector creates high pressure jets which can cause injury if exposed to the human body and also will cause damage to the painted surface.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

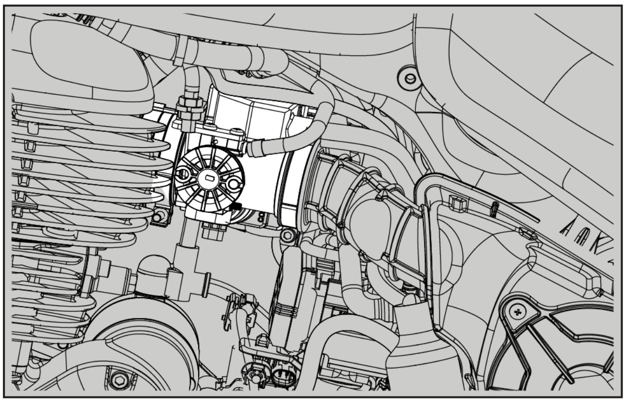
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Injector valve coupler*

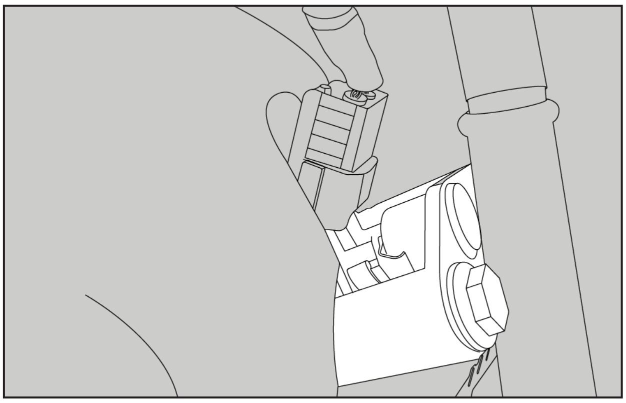
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

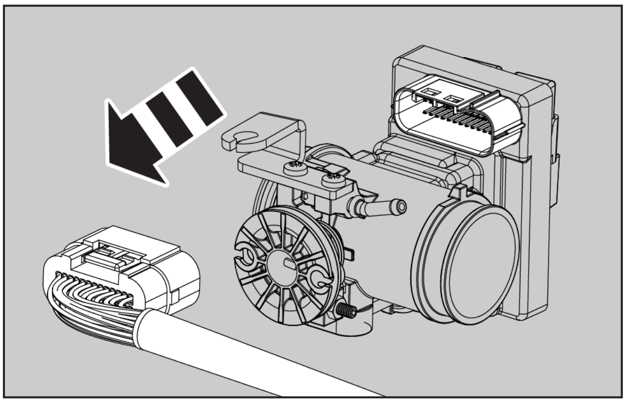
- ECU is located on the throttle body assembly



- The Injector is located on the intake manifold



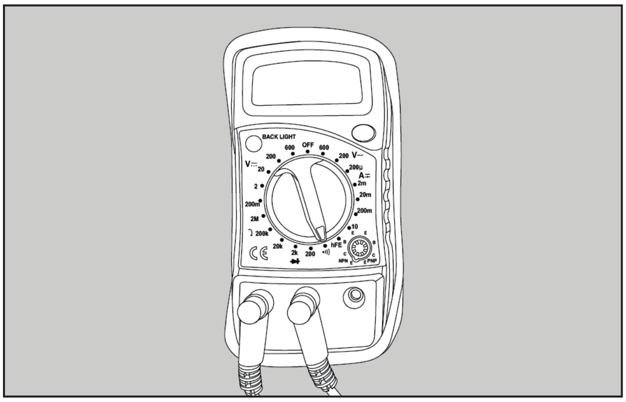
- Disconnect ECU from ECU wiring harness coupler



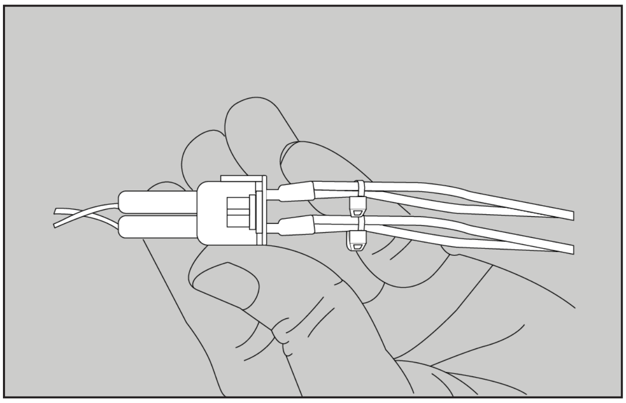
To check the Continuity of the wiring harness

STEP 1:

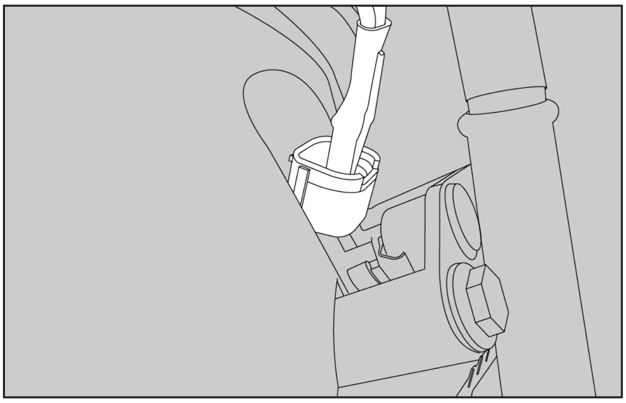
- Keep the multimeter in continuity mode.


BACK LIGHT
OFF
600
200
20
2
200m
2M
200k
20k
2k
200
hFE
10
200m
20m
2m
200μ
600
200
V~
A
V
NPN
PNP
E
B
C

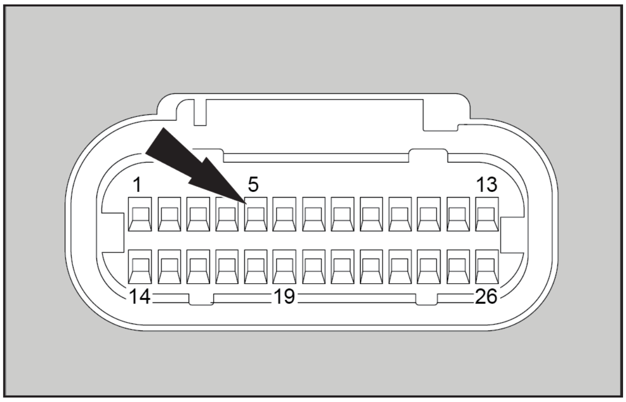
- Connect the Test lead wire 90 series (orange color) in the injector valve wiring harness coupler.
    - 90 series (orange color) with the Black tag in Pin 1 of injector valve wiring harness coupler
    - 90 series (orange color) with the red tag in Pin 2 of injector valve wiring harness coupler



- Keep the multimeter positive probe to Pin 2 (90 series test lead wire with the red tag) of the injector wiring harness coupler.



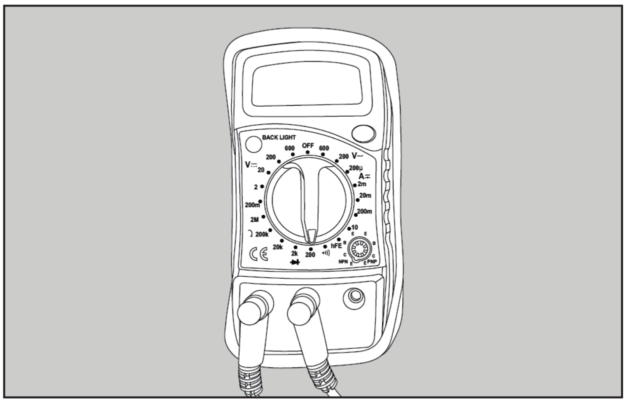
- Connect a 40 series test lead wire (yellow color) with the black tag to pin 5 of the ECU wiring harness coupler.



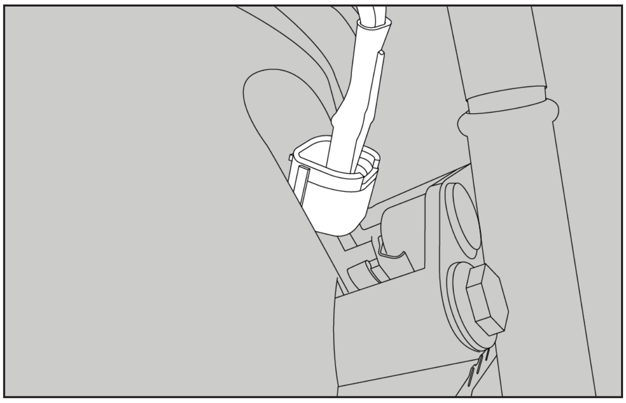
- Check for continuity (Beep Sound from the multimeter)

To check the Resistance

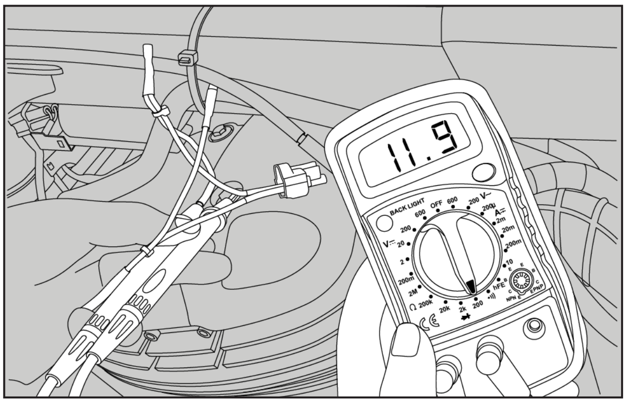
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Test lead wire 90 series (orange color) in the injector valve coupler.
  - 90 series (orange color) Test lead wire with the black tag in Pin 1 of injector valve coupler
  - 90 series (orange color) Test lead wire with the red tag in Pin 2 of injector valve coupler

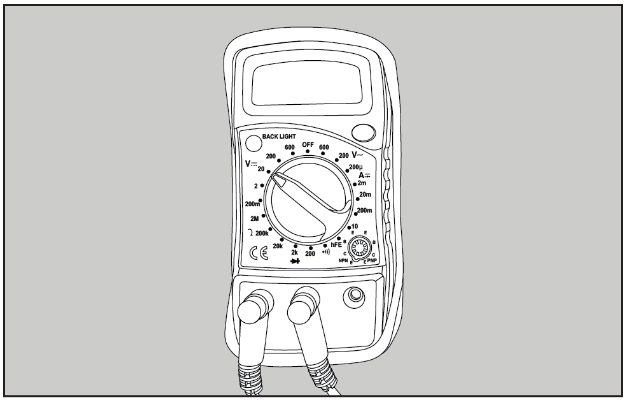


- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and Pin 2 (90 series test lead wire with red tag). Resistance value to be 11.4 to 12.6 Ohms @ 30+5°C

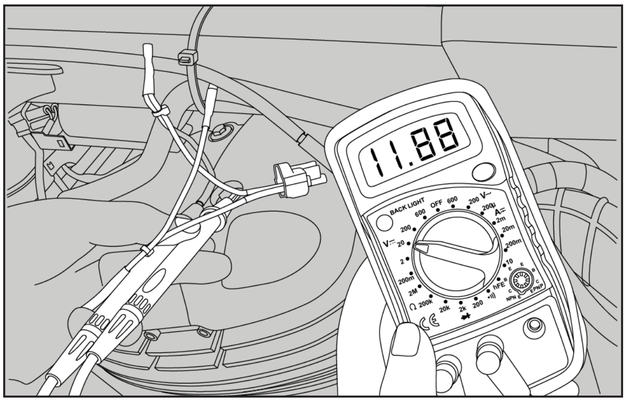


To check the Input voltage

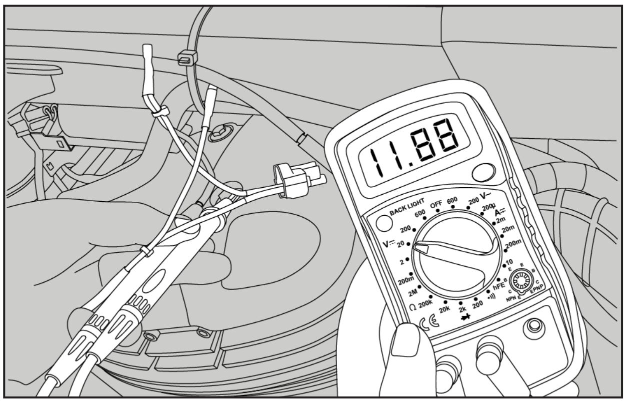
- Keep the multimeter in voltage mode (20 V)



- Connect the test lead wire 90 series (orange color) in the injector valve wiring harness coupler.
  - 90 series (orange color) with the black tag in Pin 1 of injector valve wiring harness coupler
  - 90 series (orange color) with the red tag in Pin 2 of injector valve wiring harness coupler



- To check the voltage of the sensor, connect the multimeter positive probe to pin 1(90 series Test lead wire orange color with black tag) and negative to body ground in the wiring harness coupler and turn on the ignition. The voltage should be equal to the battery voltage (12 V).



d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (11.4 to 12.6 Ohms), you replace with Injector valve
- If the input voltage is meeting the specified limit and the resistance is within the specified limit and if continuity is available then you have to replace the ECU

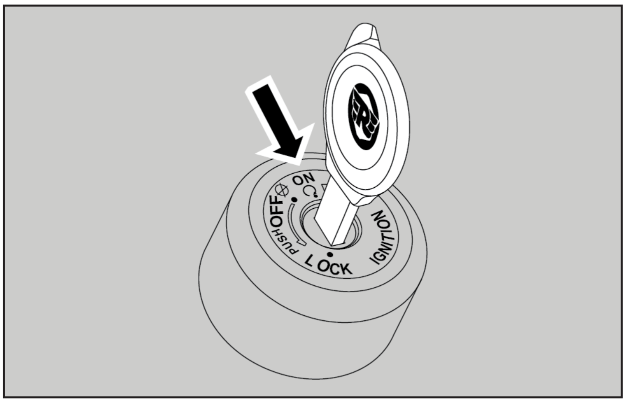
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

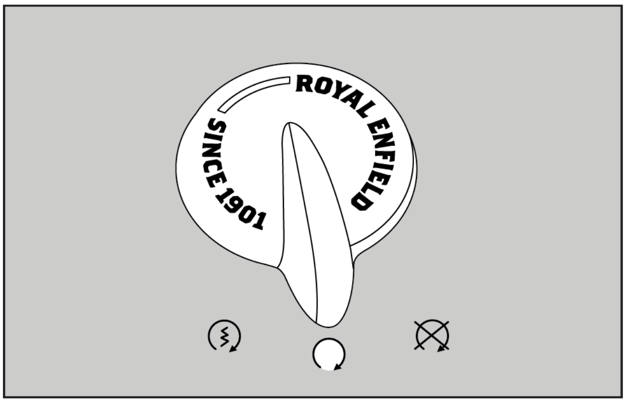
1.4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P0563 - BATTERY VOLTAGE
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0563	Battery voltage	Battery voltage High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

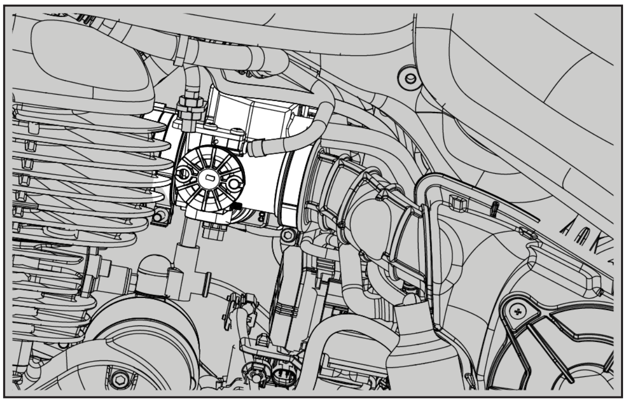
TROUBLE CODE : DTC CODE: P0563

Type of error : Battery voltage high

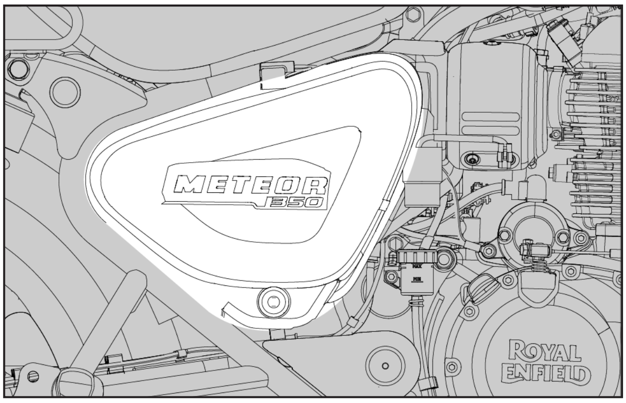
b.Preliminary Checks (Basic Check Points):

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

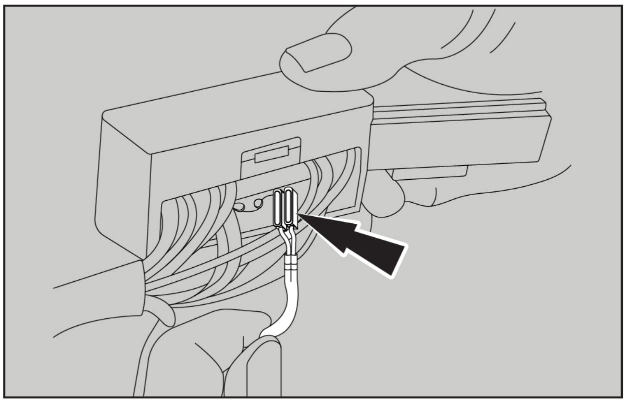
- ECU coupler is located in the Throttle body Assembly



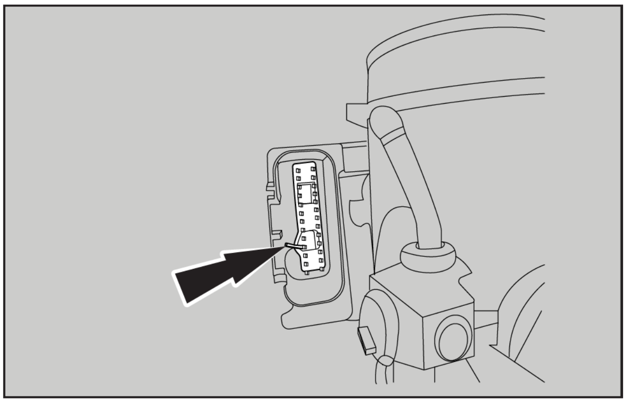
- The battery is located in right side Panel



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again.



- Ensure there is no bend or deformation on the pin of the ECU and Battery couplers, and check for any sulphur formation on the battery terminals, if found change the battery or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the Battery /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

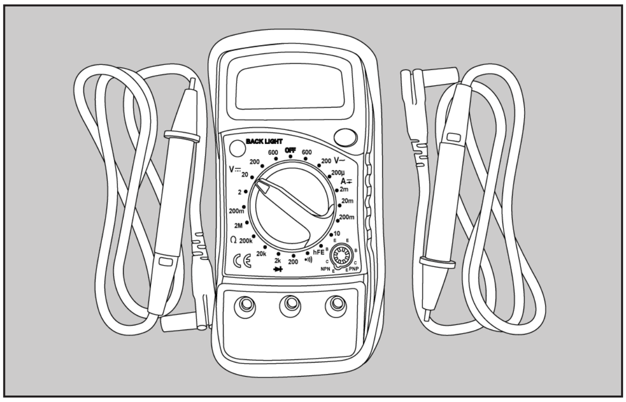
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

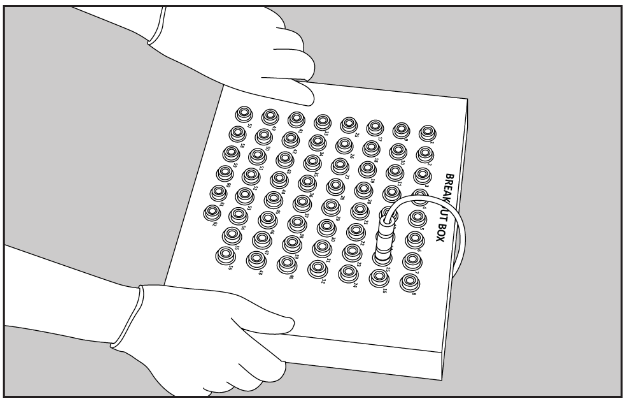
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)

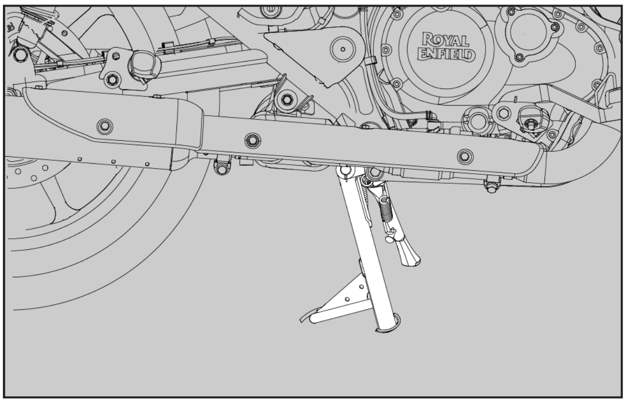


- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

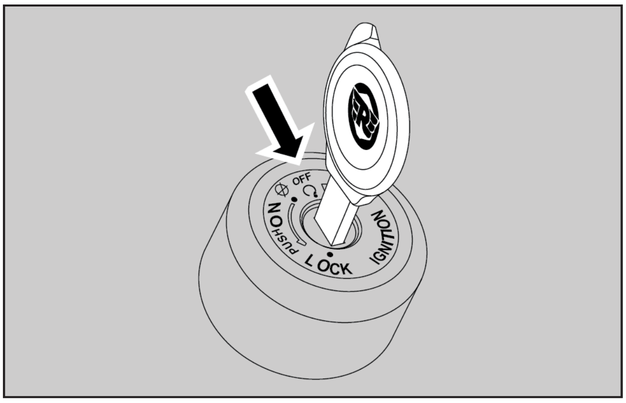


b. Pre-Checks:

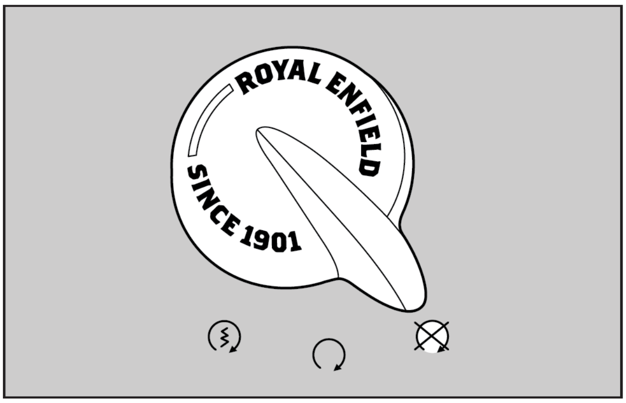
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition



- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12V
- (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)
- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

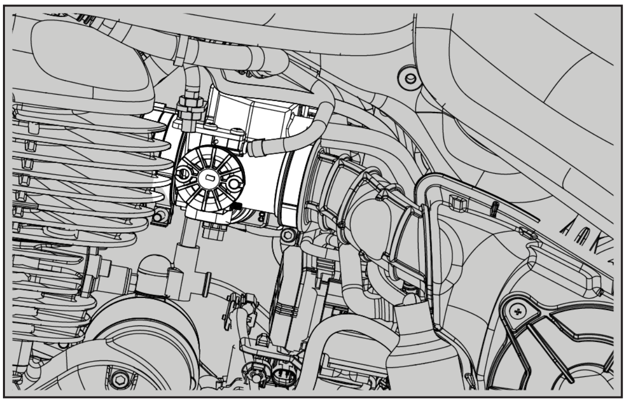
NOTE

- *Please remove right side panel from the motorcycle to access the battery*

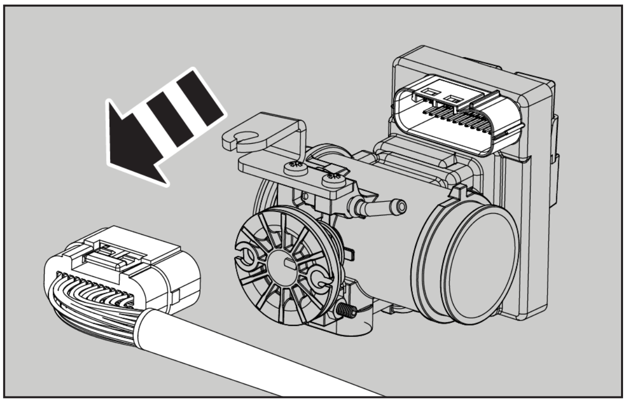
NOTE

- *Removal & refitment of right side panel mentioned in the service manual (exclusive hyperlink here)*

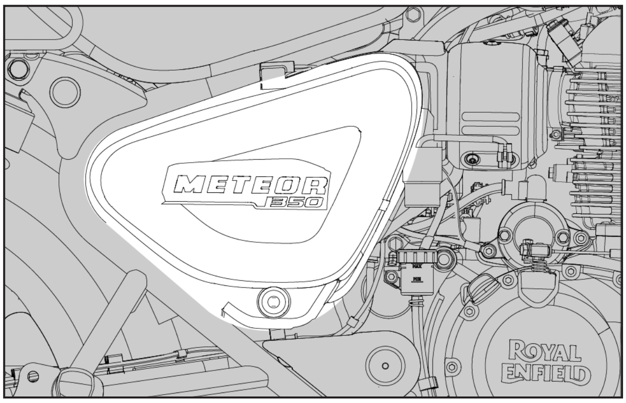
- ECU is located in the throttle body assembly



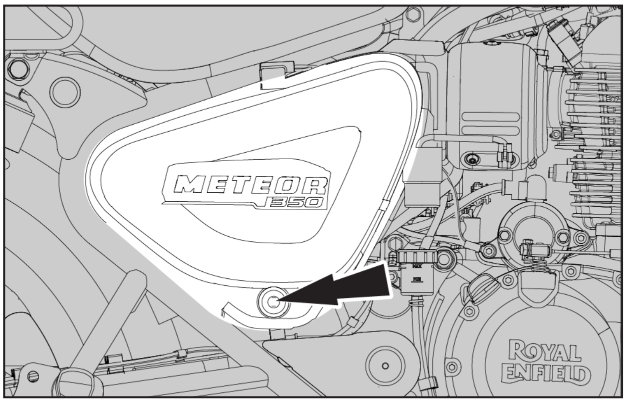
- Disconnect ECU coupler.

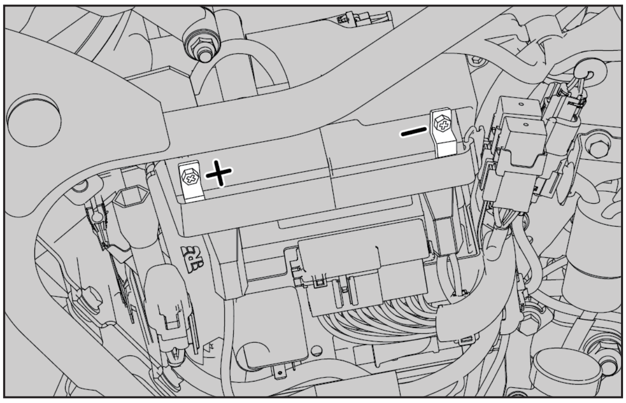


- The battery is Located in Right side panel

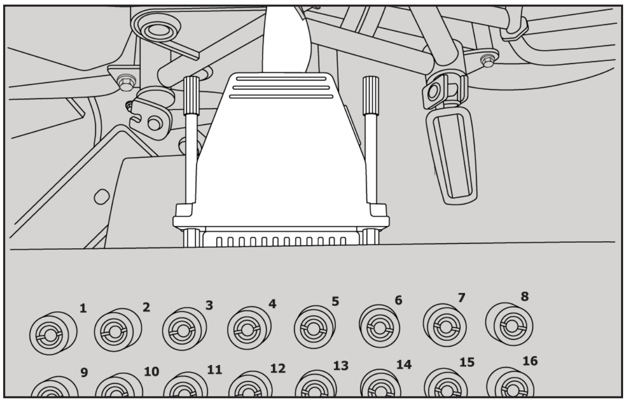

METEOR
350
ROYAL
ENFIELD

- Unlock RH side panel clockwise using key and gently locate the Battery


METEOR
350
ROYAL
ENFIELD

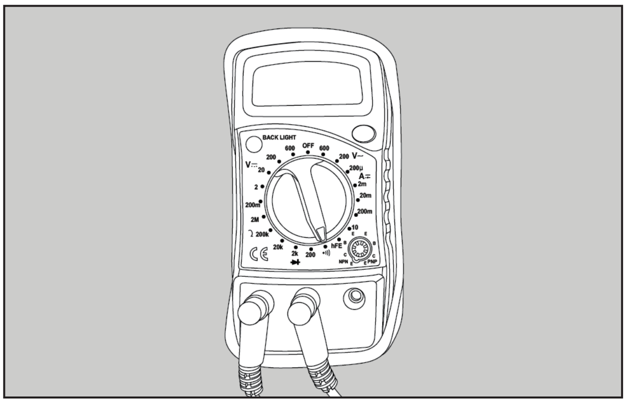


- Connect ECU breakout box harness coupler to Breakout box harness (62 Pin Kit)

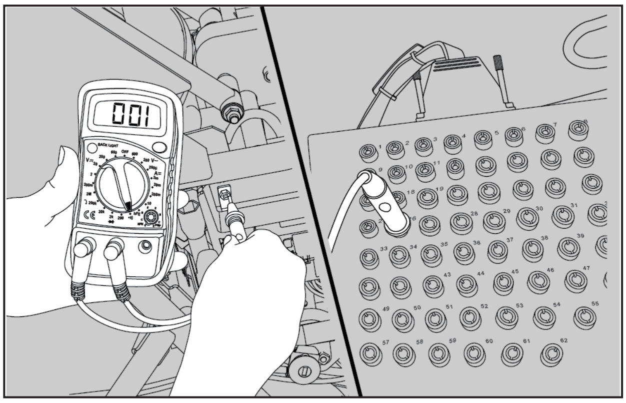

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

To check the Continuity of Wiring harness

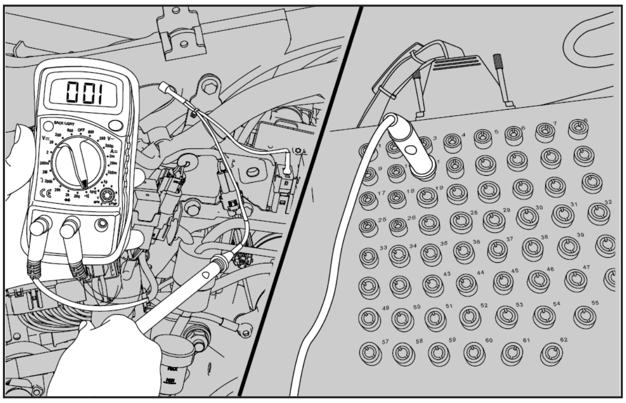
- Keep the multimeter in continuity mode.

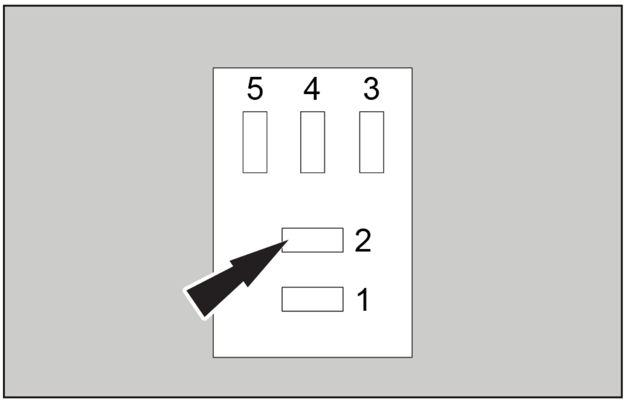


- Disconnect the battery positive coupler and using multimeter Check between battery positive coupler in Wiring harness and Socket 26 of the ECU breakout box for continuity (Beep sound from multimeter)

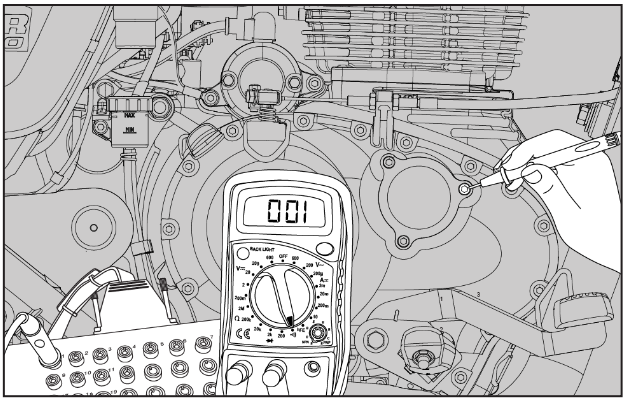


- Using multimeter check between Pin no 2 of the Power relay (Contact output) and Socket 11 of the ECU breakout box for continuity (Beep sound from multimeter)



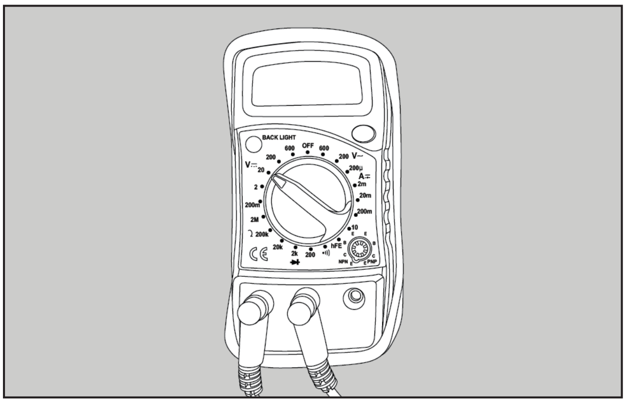


- Check between Body ground/Battery negative cable and Socket 1 of the ECU breakout box for continuity (Beep sound from multimeter)

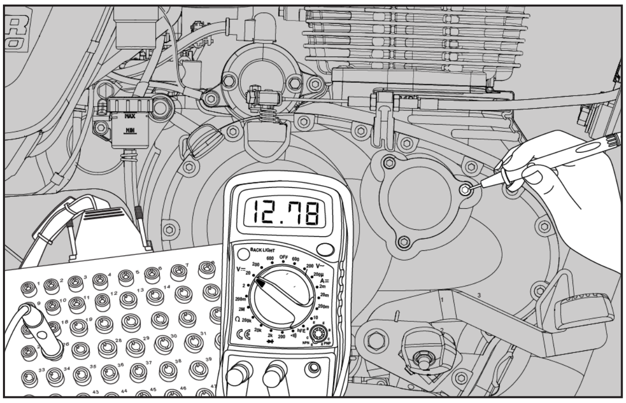


To check the voltage at ECU point (input voltage check)

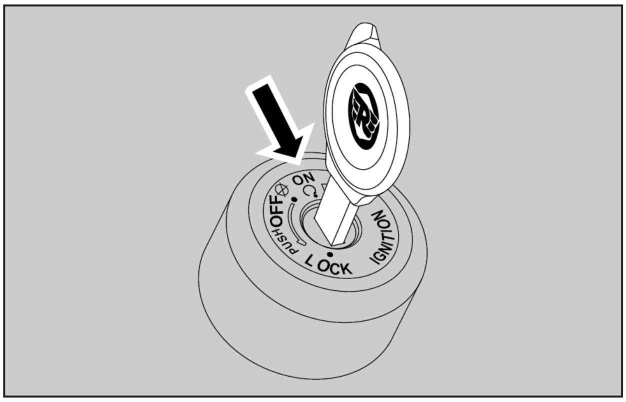
- keep the multimeter in voltage mode (20V)

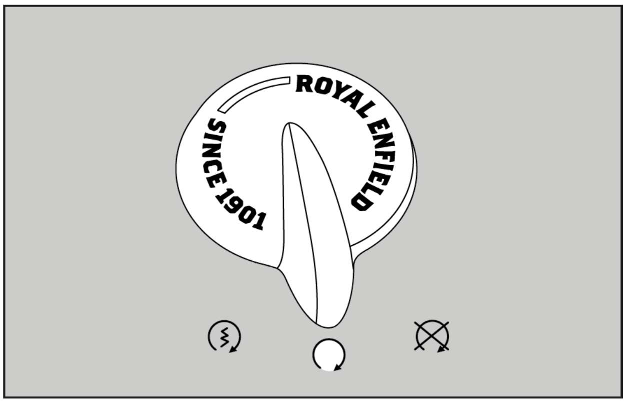


- Place the Multimeter positive probe in Socket 26 of the ECU breakout box and negative probe in Body ground or Battery Negative, Check the Open circuit voltage (OCV), it should be greater than 12V.

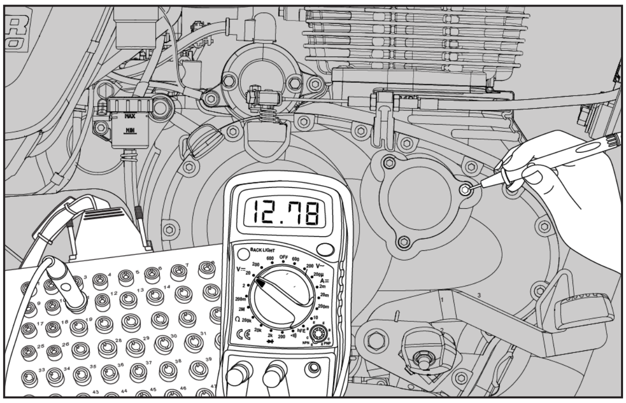


- Turn “ON” the Ignition switch and Kill switch


ON
OFF
PUSH
LOCK
IGNITION

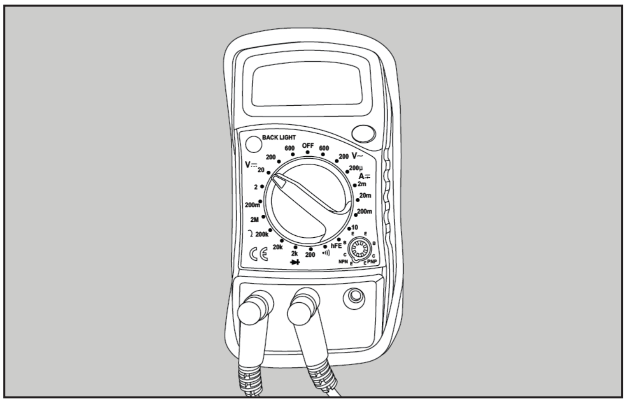

ROYAL ENFIELD
SINCE 1901

- Place the Multimeter positive probe in Socket 11 of the ECU breakout box and negative probe in Body ground or Battery Negative. Check the Voltage, it should be greater than 11.8V.

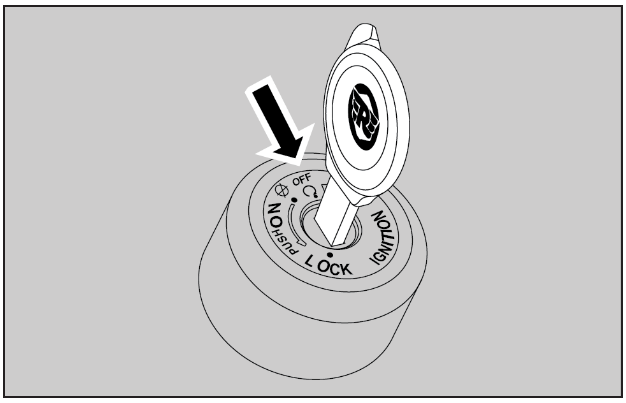


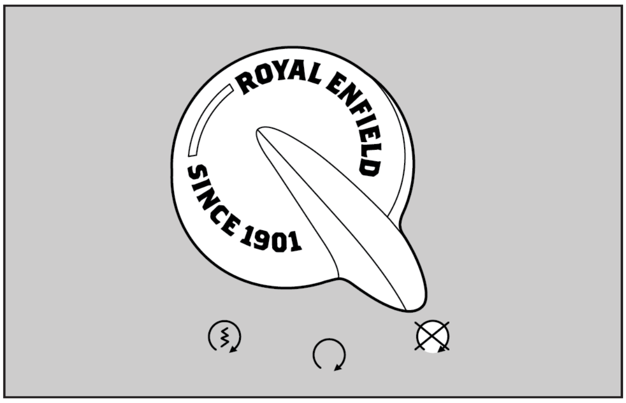
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

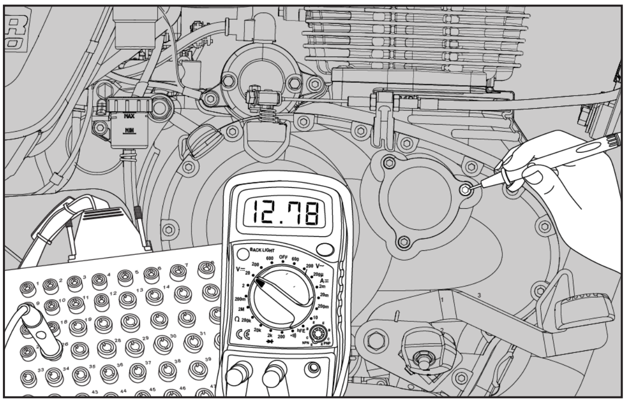

BACK LIGHT
OFF
V⎓
A⎓
V~

- Turn “ON” the Ignition switch, Kill switch and start the vehicle and run at idling RPM

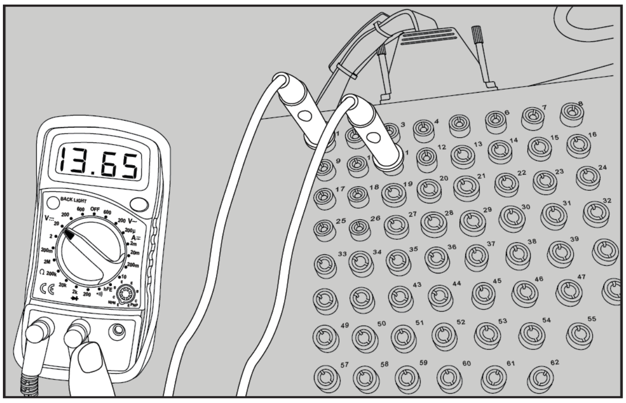

OFF
ON
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Place the Multimeter positive probe in Socket 26 of the ECU breakout box and negative probe in Body ground or Battery Negative. Check the voltage, It should be increased from open circuit voltage (OCV) and should be less than 14.7V



- Similarly, place the multimeter positive probe in Socket 11 of the ECU breakout box and negative probe in Socket 1 of the ECU breakout box or Body ground or Battery Negative, Check the voltage. It should be increased from Initial voltage and should be less than 14.7V



d.Decision point

- If the Resistance is not within the specified limit, You may please replace the Stator coil
- If stator coil resistance is as per specifications but If the voltage is not within the specified limit, You may please replace the RR unit.

3. If the continuity is found Ok and Voltage is not meeting the specification, then you have to check the Stator coil and RR Unit by following the checking procedure of the Stator coil and RR Unit.

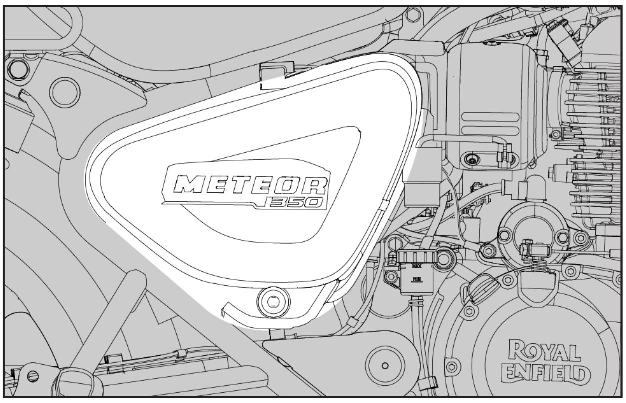
   It is recommended to replace the Battery/RR Unit/ Stator Coil /ECU / Wiring Harness as per the advice from Royal Enfield only

1.3. TEST LEAD WIRE METHOD :

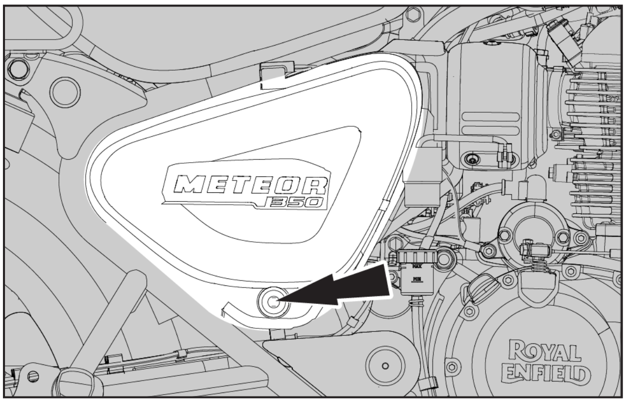
NOTE

- *Please note that the test lead wire method to check this error code is not recommended by RE, hence suggesting you perform a direct method to fix this error code using multimeter itself. Please follow the steps mentioned below.*

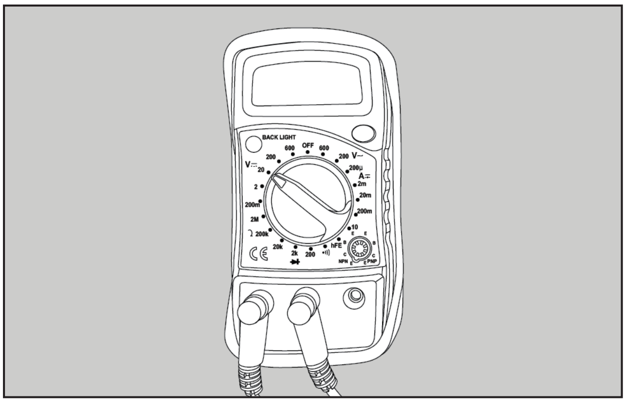
- The battery is Located in Right side panel



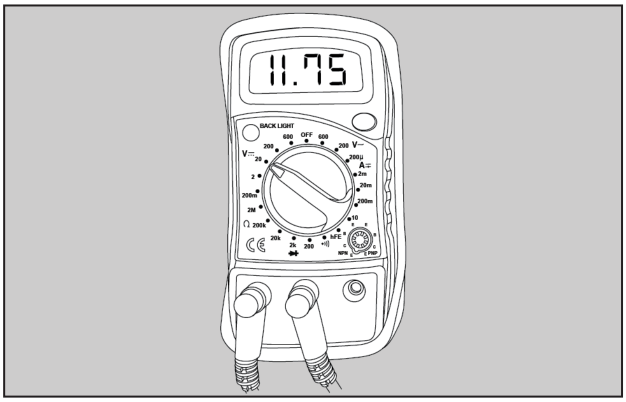
- Unlock RH side panel clockwise using key and gently locate the Battery



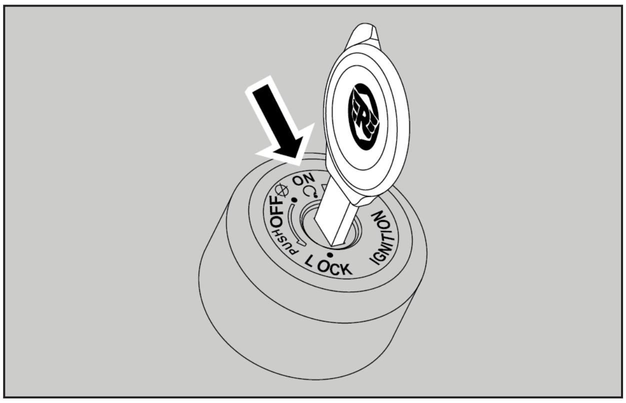
- Keep the multimeter in Voltage mode (20V)

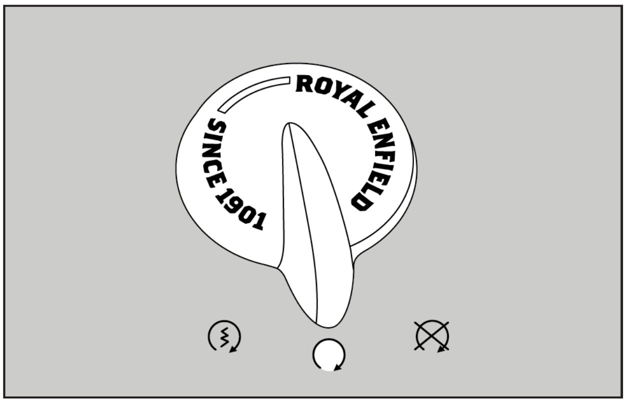


- Place the Positive probe of the multimeter on the Positive terminal of the battery and Negative probes of multimeter in the negative terminal of the battery and check for battery voltage Open circuit voltage (OCV), it should be 12 V (battery voltage)

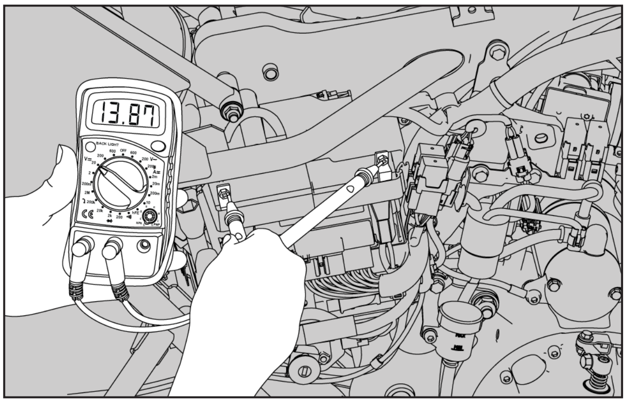


- Turn “ON” the kill switch and ignition switch



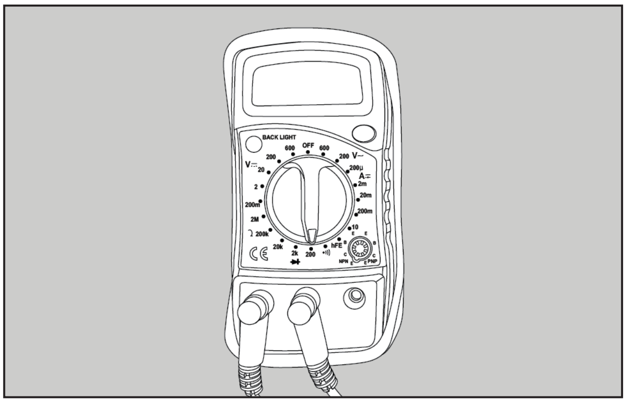


- Start the engine and check for output voltage at battery terminals Closed-circuit voltage (CCV). At engine idling RPM, the output voltage should be greater than the voltage observed while the engine is off. Give throttle and increase the throttle and keep the RPM at 2000 to 2500 RPM. The Charging voltage should be between 13.5 V to 14.7 V

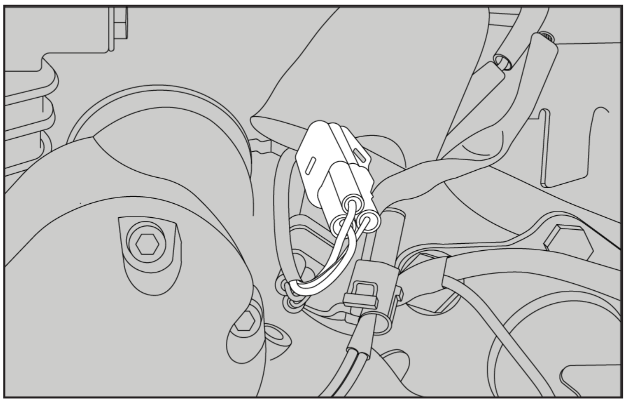


To Check Stator Coil

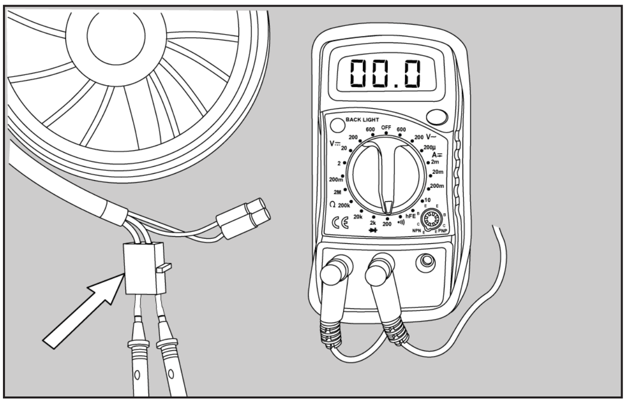
- Keep the multimeter in resistance mode

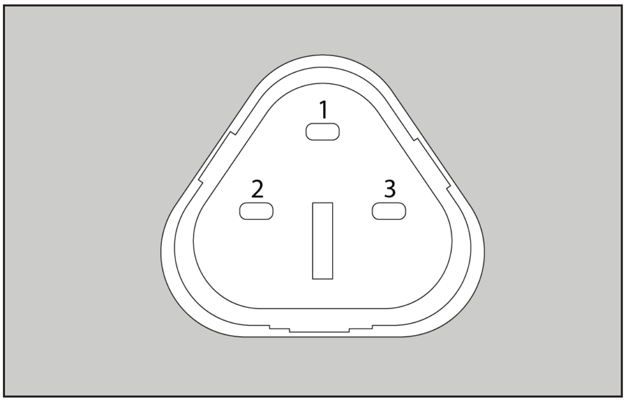


- Stator Coil is located on the LH Case
- Loosen the stator coil coupler



- Place the Positive and Negative probes of multimeter in the Stator coil coupler on the stator coil as mentioned below.
- Keep the multimeter in Resistance mode (200 Ohms), Check the resistance between
  - PIN 1 - PIN 2 = 0.280 Ohms to 0.380 Ohms
  - PIN 2 - PIN 3 = 0.280 Ohms to 0.380 Ohms
  - PIN 3 - PIN 1 = 0.280 Ohms to 0.380 Ohms





d.Decision point

1. If voltage is not meeting the specification, then you have to check the Stator coil and RR Unit by following the checking procedure of the Stator coil and RR Unit.
2. If the Resistance is not within the specified limit, You may please replace the Stator coil
3. If stator coil resistance is as per specifications but If the voltage is not within the specified limit, You may please replace the RR unit.

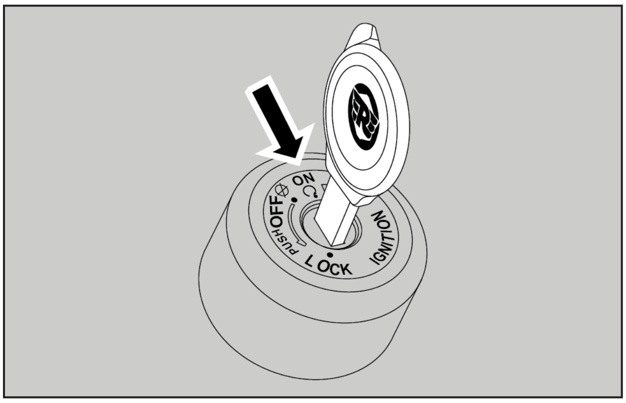
   It is recommended to replace the Battery/RR Unit/ Stator Coil /ECU / Wiring Harness as per the advice from Royal Enfield only

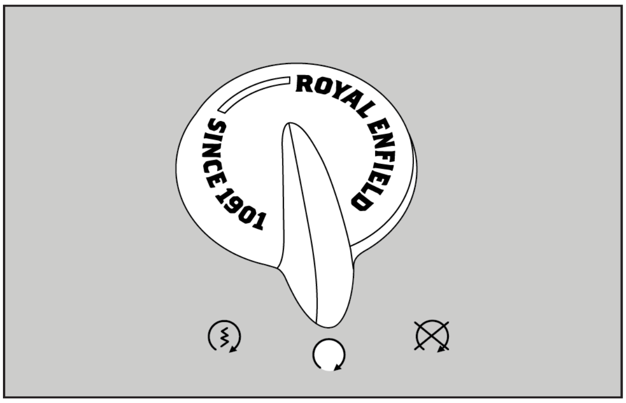
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P0335- CRANK SENSOR

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0335	Crank sensor	Crank sensor error

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Crank sensor is also called as pulsar coil

TROUBLE CODE : DTC CODE: P0335

Type of error : Crank sensor error

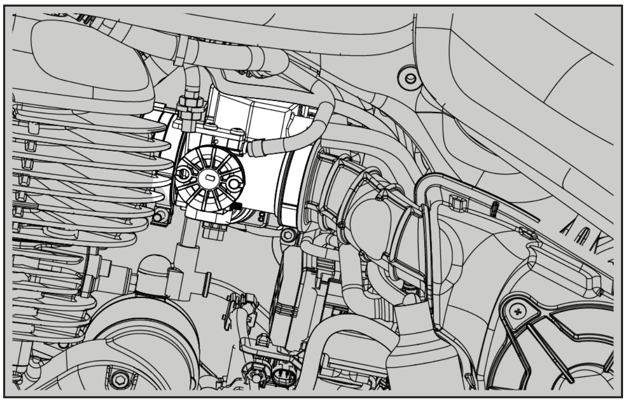
(i) Information : Crank sensor circuit fault / Crank sensor internal fault

b.Preliminary Checks (Basic Check Points):

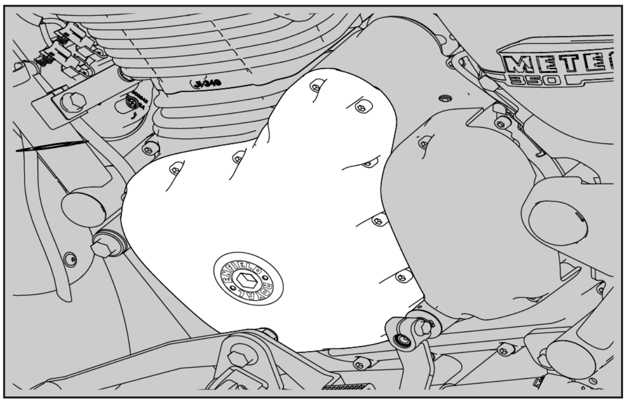
⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

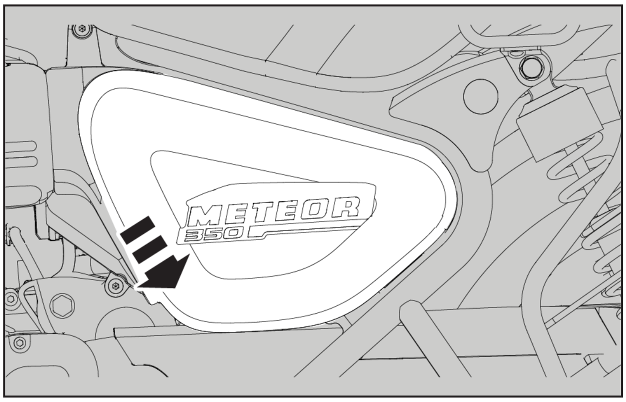
- ECU is located on the throttle body assembly



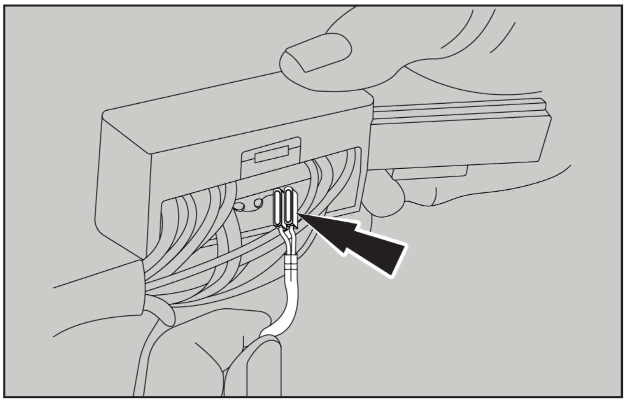
- The crank sensor is located on Left side engine crankcase



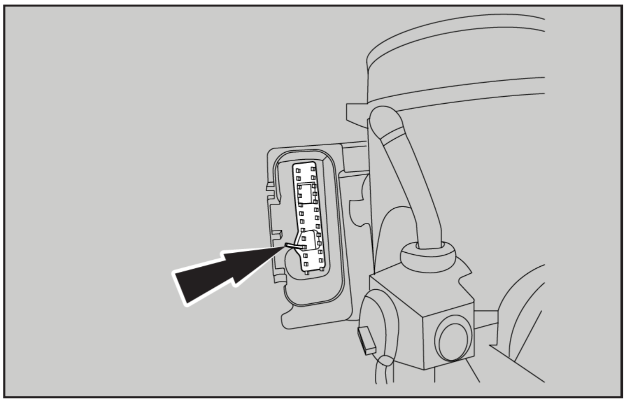
- Crank sensor coupler is located inside LH side panel bottom side



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

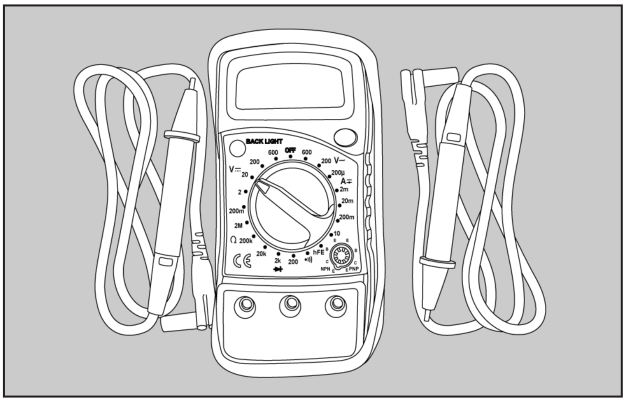
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

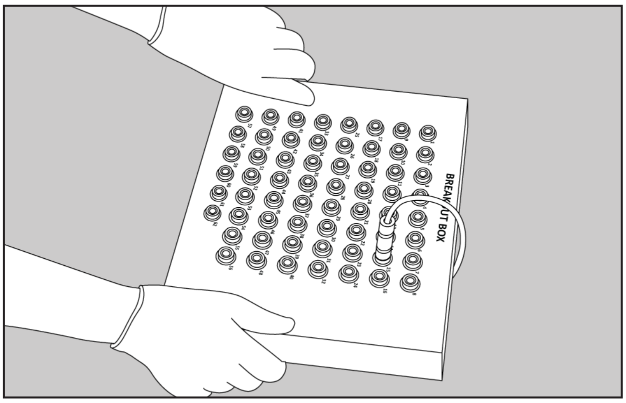
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

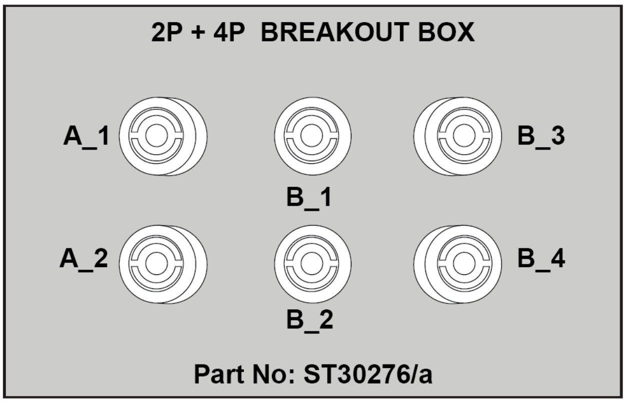
- **Tools Required**
- Multimeter (Universal)


BACK LIGHT
OFF

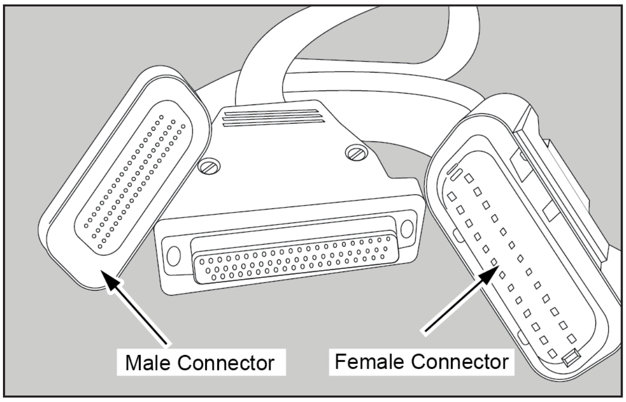
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

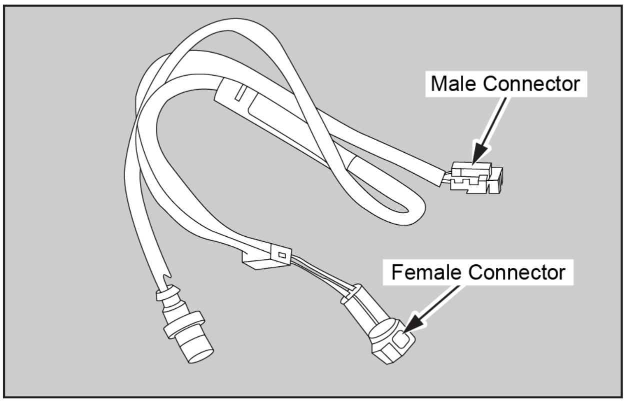
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

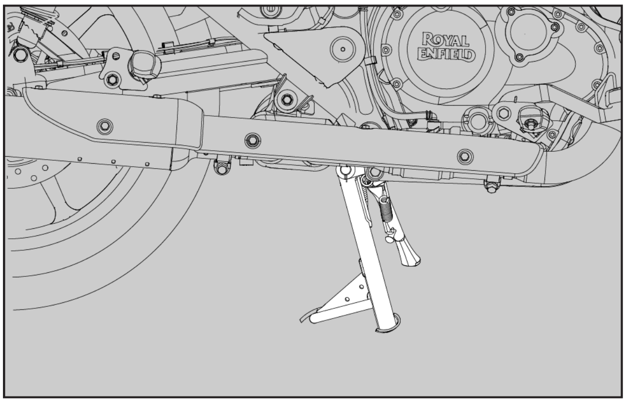

Male Connector
Female Connector

- EOT,Crank position, ignition coil -Sensor breakout box harness-2 pin ST30280/A

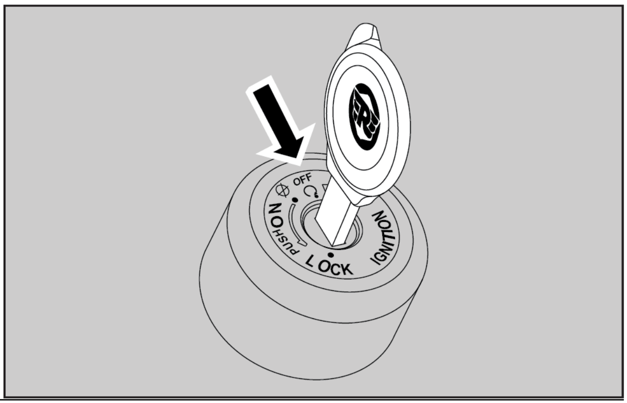

Male Connector
Female Connector

b. Pre-Checks:

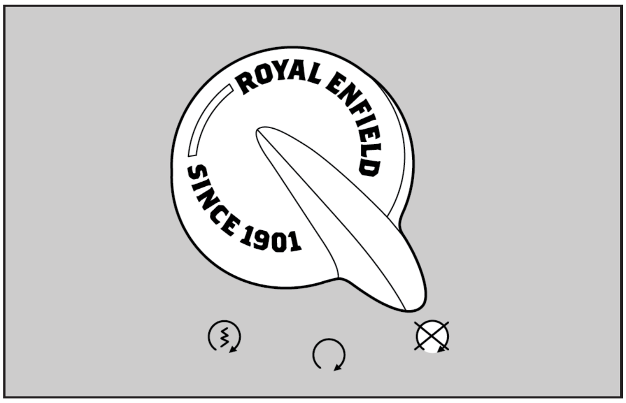
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less-Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**

⚠ CAUTION

- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU**

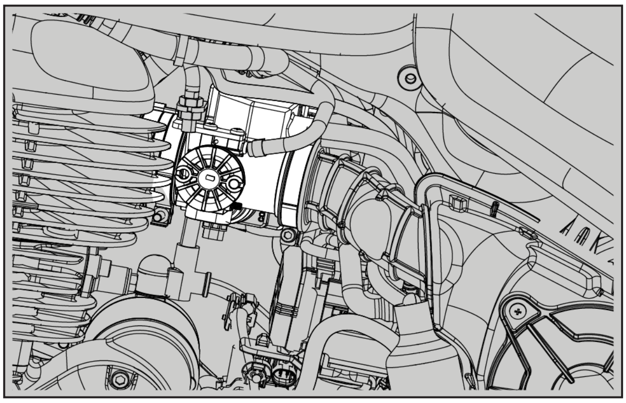
NOTE

- *Remove Left side panel to access the crank sensor coupler.*

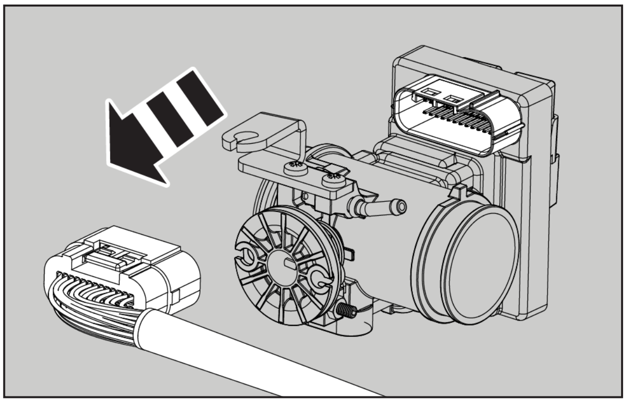
NOTE

- *Removal & refitment procedure of the left side panel is mentioned here as a hyperlink (exclusive service manual)*

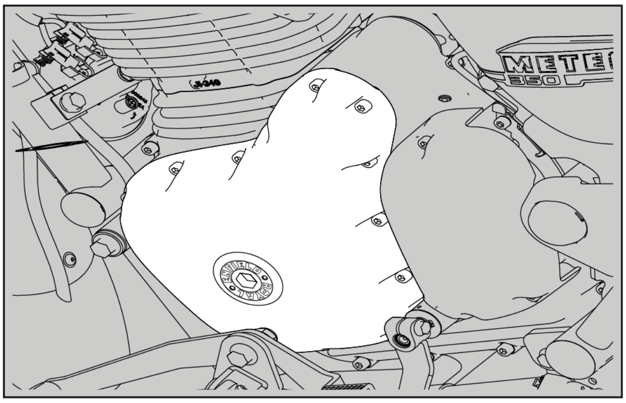
- ECU is located in the throttle body Assembly



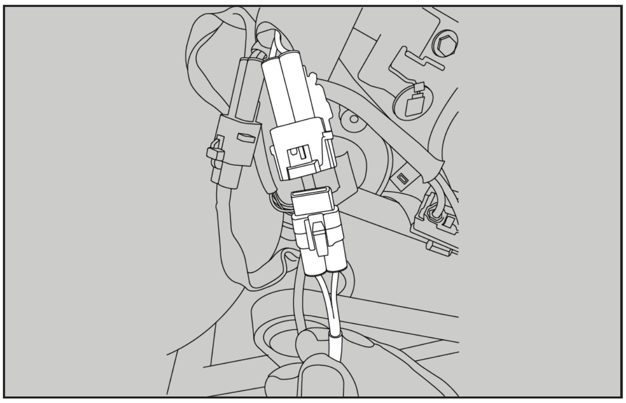
- Disconnect ECU from ECU coupler.



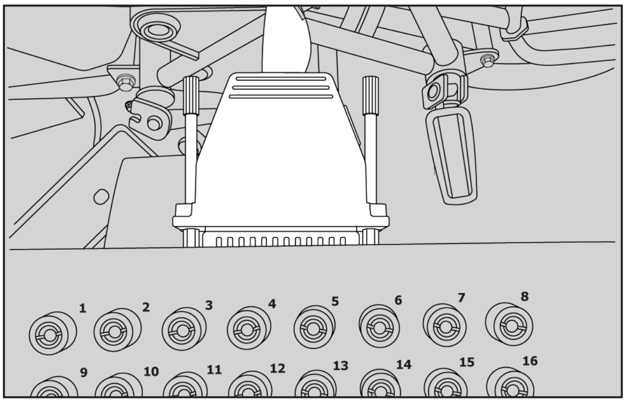
- Crank sensor is located on the Left side engine case



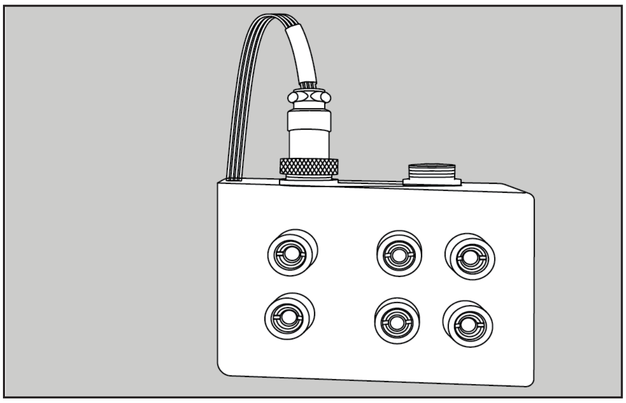
- Disconnect Crank position sensor from wiring harness coupler (black color coupler)



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness

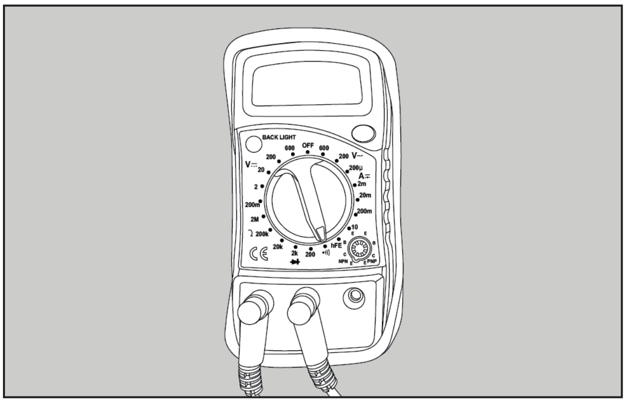


- Connect sensor Breakout Box (2P+4P Pin) to Crank position sensor breakout box harness kit

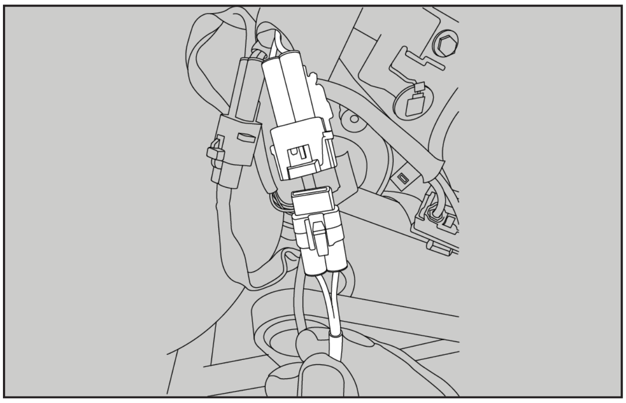


To Check Continuity of Wiring harness

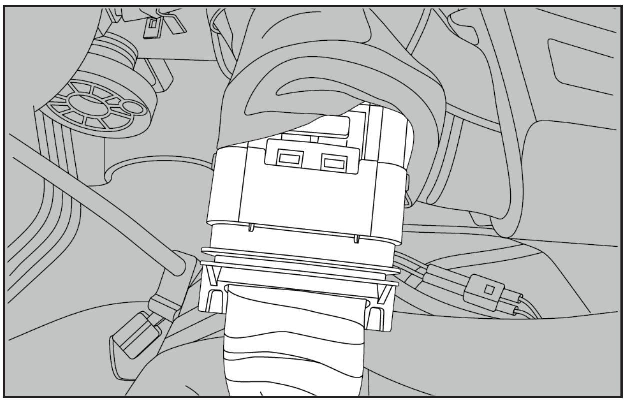
- Keep the multimeter in Continuity mode



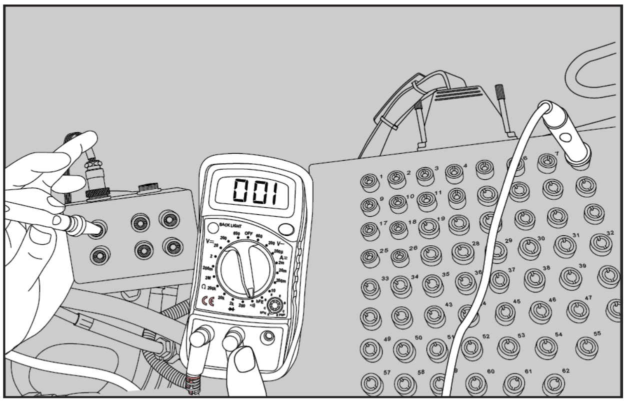
- Connect the crank position Sensor breakout box harness to Crank position sensor wiring harness coupler



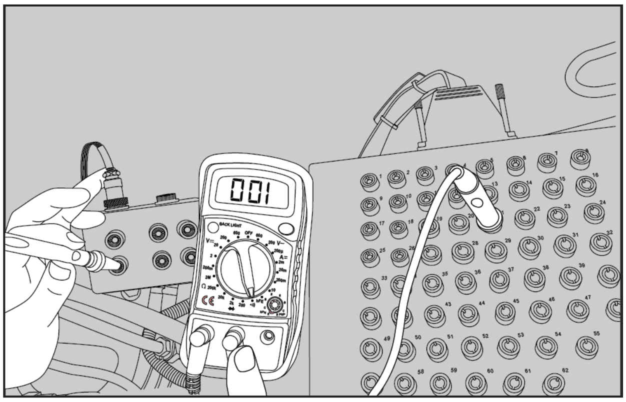
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in socket 8 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

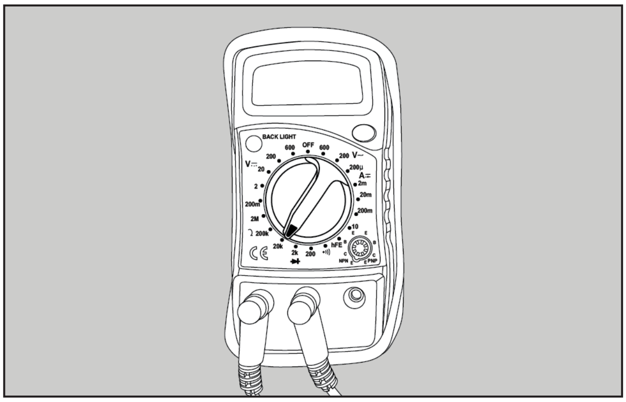


- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 21 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

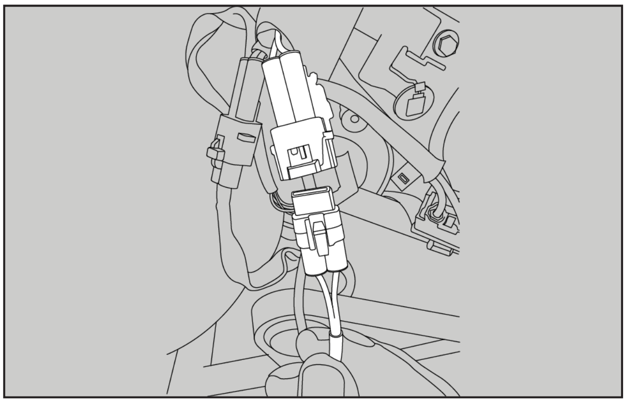


To Check the Resistance

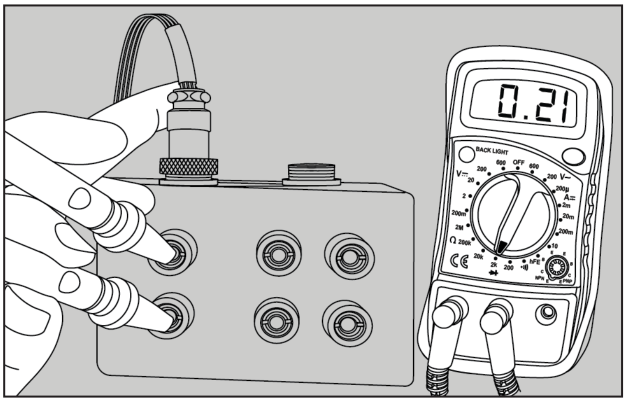
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Crank position sensor breakout box harness to the Crank position sensor coupler



- To check the Resistance value of the Crank position sensor, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box The resistance value is to be 205 to 225 Ohms @ 25+5°c



VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness
- If the resistance is not within the specified limit (205 to225 Ohms), you replace with the Stator coil
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

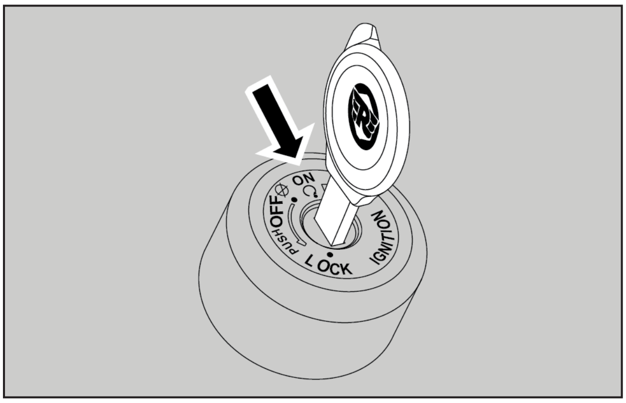
It is recommended to replace the sensor /ECU / Wiring harness as per the advice from Royal Enfield only.

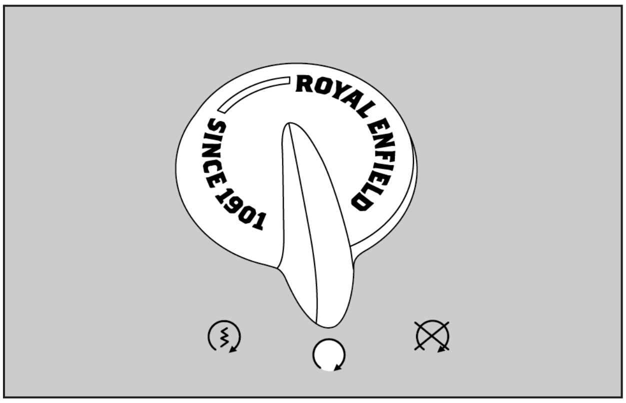
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

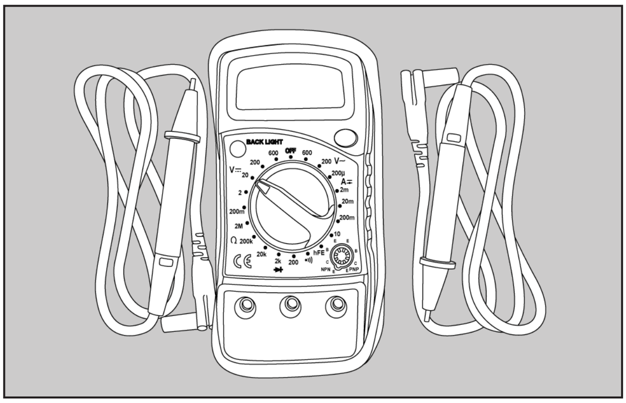
1.3. TEST LEAD WIRE METHOD:

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump-starting, etc.**

Tools Required

- Multimeter (Universal)

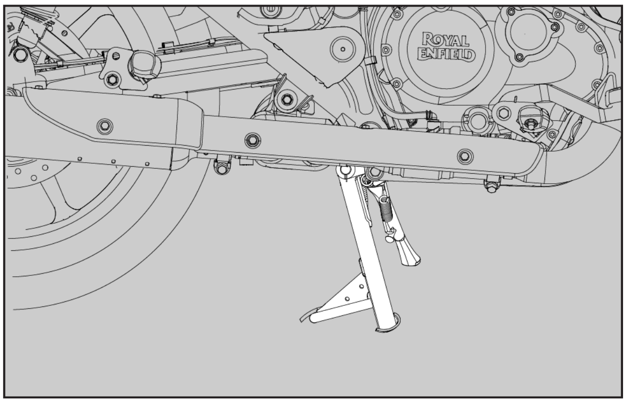


- Test lead wire (90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - Hyperlink will be given here to the chart

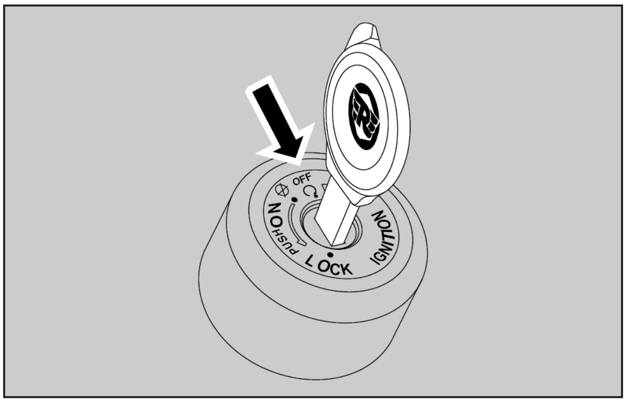
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1.Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 7.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

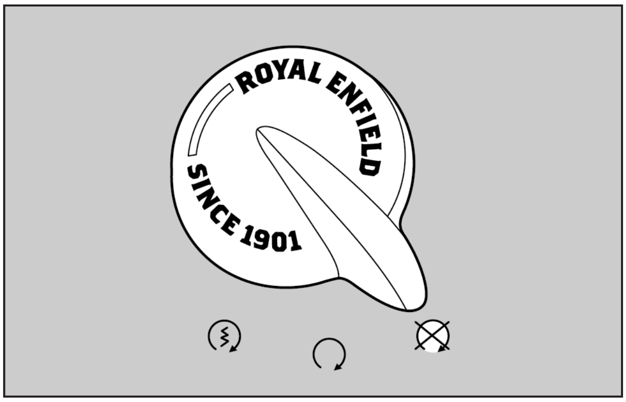
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

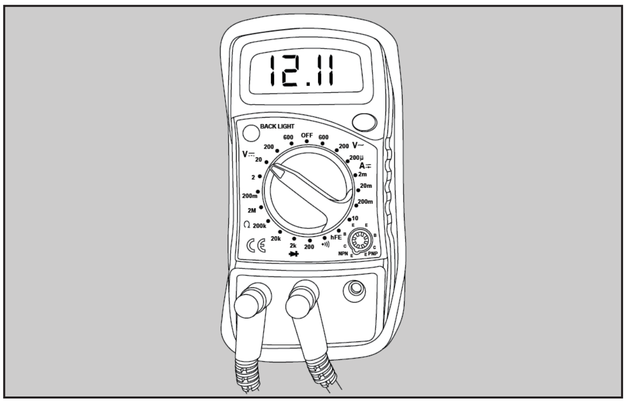


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

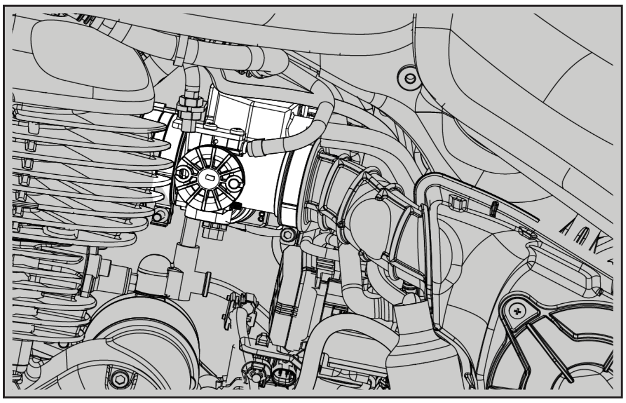
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

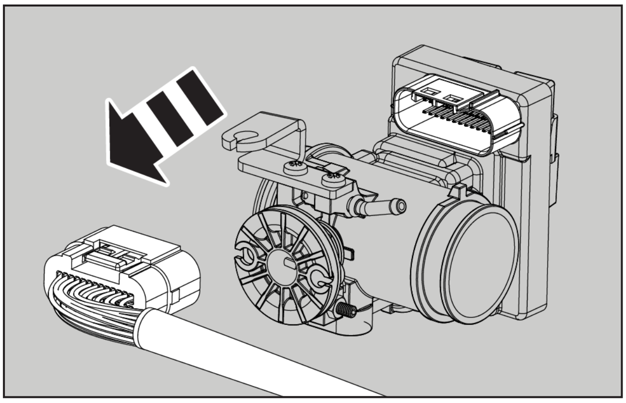
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

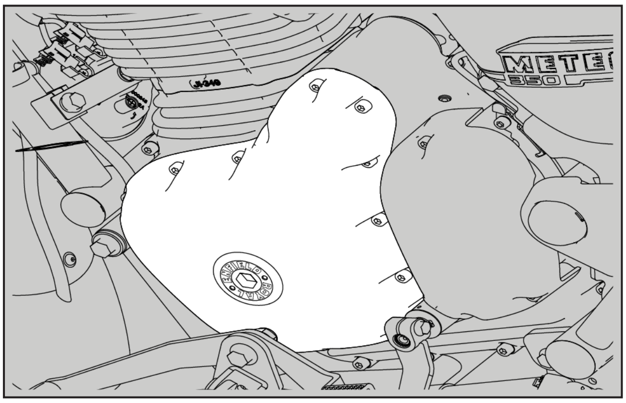
- ECU is located on the throttle body assembly



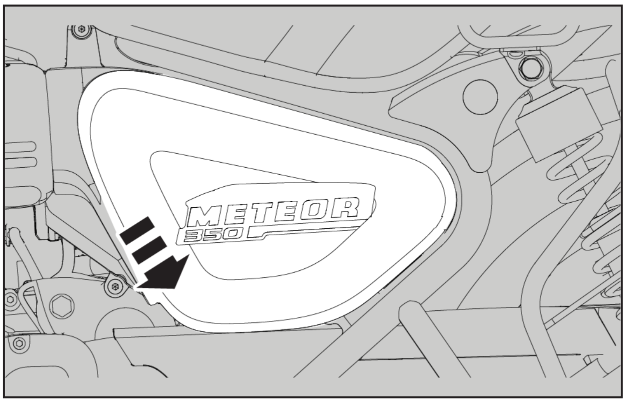
- Disconnect ECU from ECU wiring harness coupler

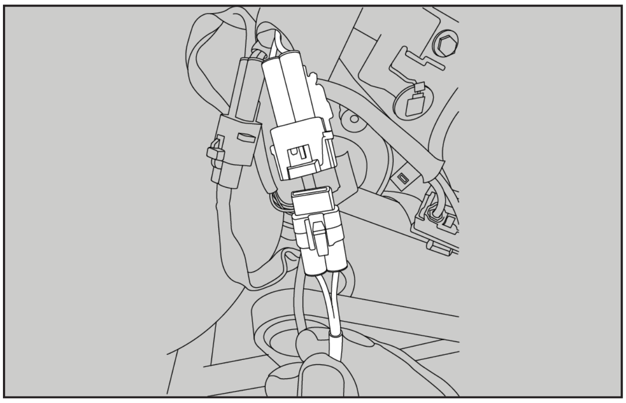


- Crank sensor coupler is located inside RH side panel bottom end



- Disconnect the Crank position sensor coupler (Black coupler).

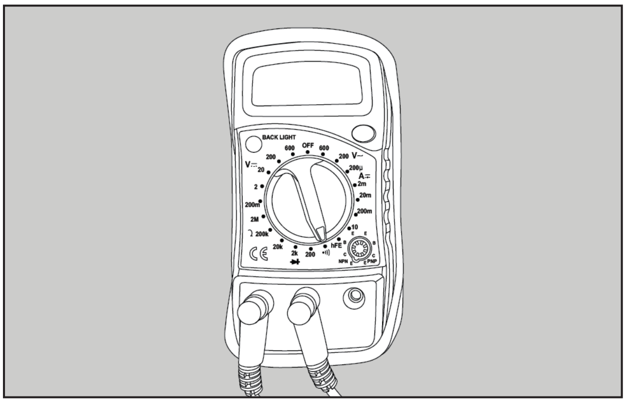




To check the Continuity of the wiring harness

STEP 1

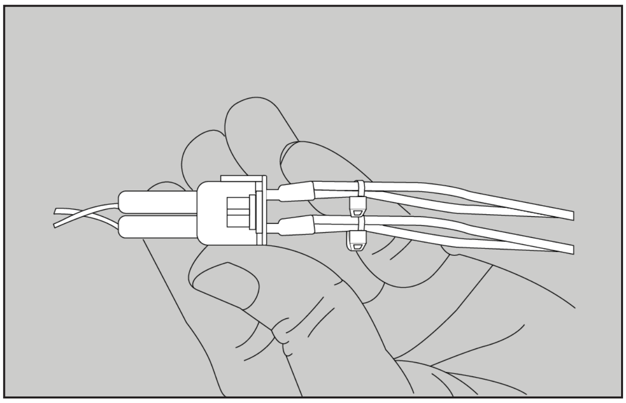
- Keep the multimeter in continuity mode.



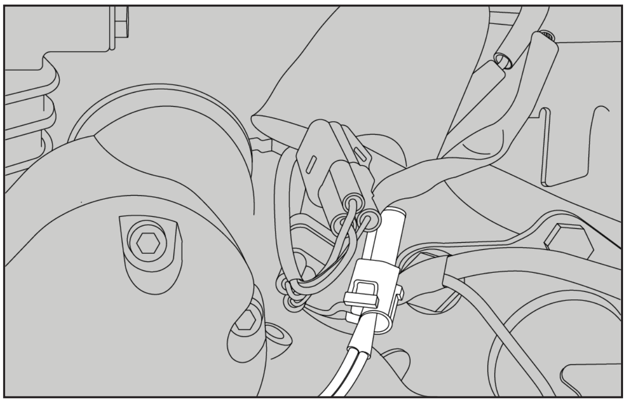
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor wiring harness coupler.

90 series (Orange Color) test lead wire with the black tag in Pin 1 of Crank position sensor wiring harness socket

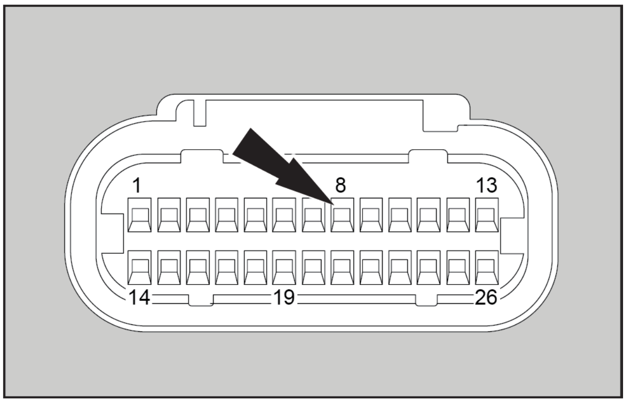
90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor wiring harness socket



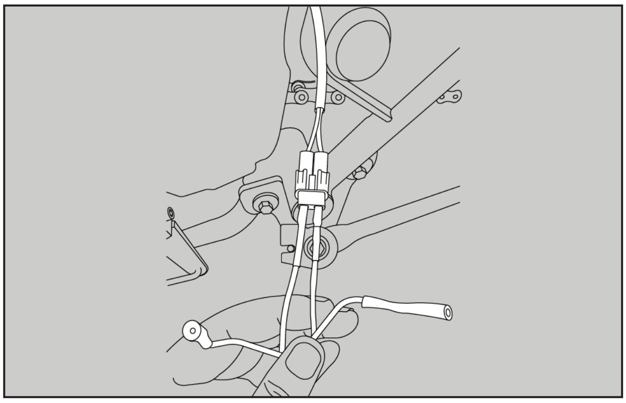
- Keep the multimeter positive probe to Pin 1 (90 series test lead wire with black tag) of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

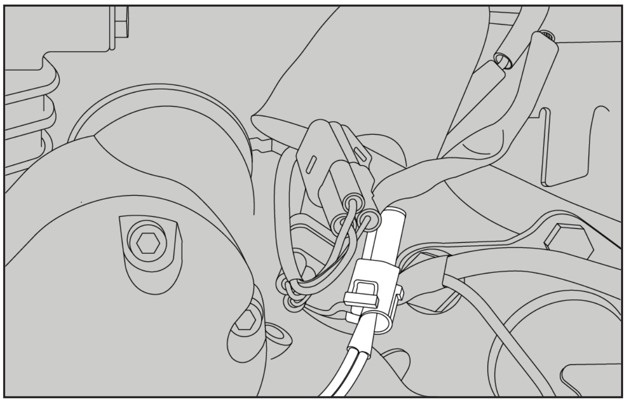


- Keep the multimeter negative probe in Pin 8 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

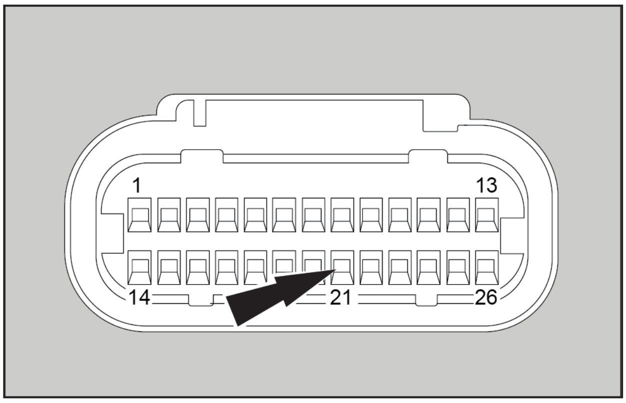


STEP 2

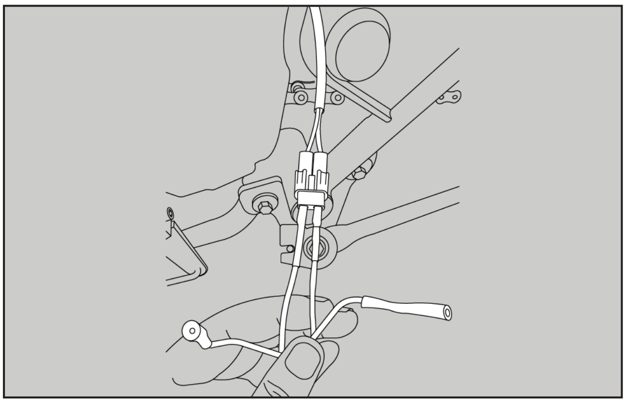
- Keep the multimeter positive probe to Pin 2 of 90 series (Orange Color) test lead wire with red tag of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 21 of the ECU wiring harness coupler



- Keep the multimeter negative probe in Pin 21 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

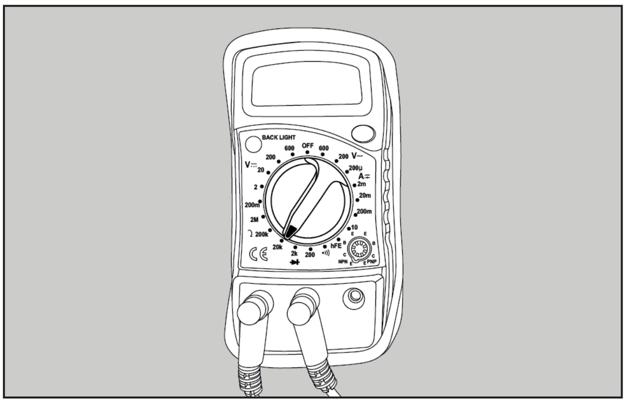


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Resistance

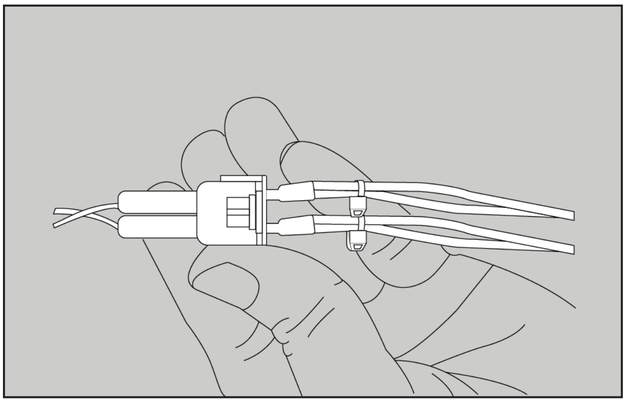
- Keep the multimeter in Resistance mode (2K ohms)



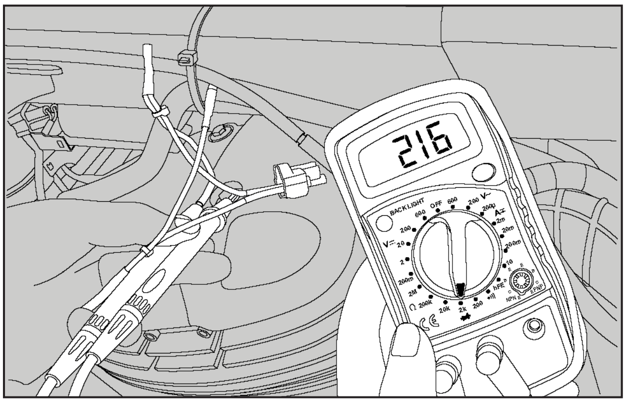
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor coupler.

90 series (orange color) test lead wire with the black tag in Pin 1 of Crank position sensor coupler

90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor coupler



- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and negative probe in Pin 2 (90 series test lead wire with red tag). Resistance value to be 205 to 225 Ohms.



⚠ CAUTION

Please ensure while disconnecting and connecting test lead wire to the couplers, ensure there is no bend or damage.

VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. Decision Point:

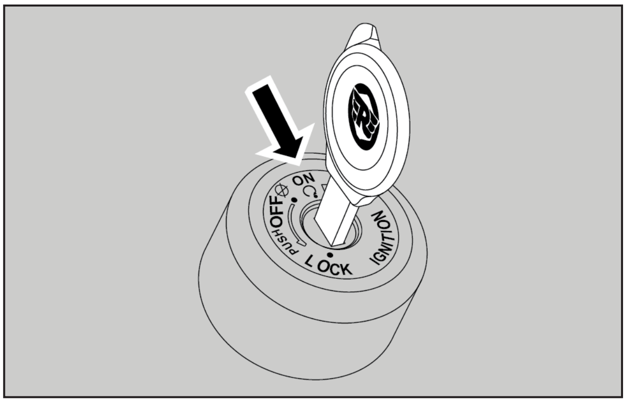
- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (205 – 225 Ohms), you replace it with the Stator coil.
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

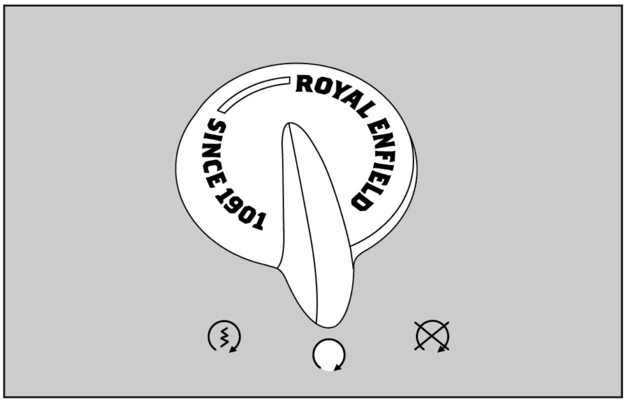
It is recommended to replace the sensor /ECU / wiring harness as per the advice from Royal Enfield only.

DTC Clearing Procedure:

⚠ CAUTION
With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0336- CRANK SENSOR DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0336	Crank sensor	Crank sensor synchronization lost

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Crank sensor is also called as pulsar coil

TROUBLE CODE : DTC CODE: P0336

Type of error : Crank sensor synchronization lost

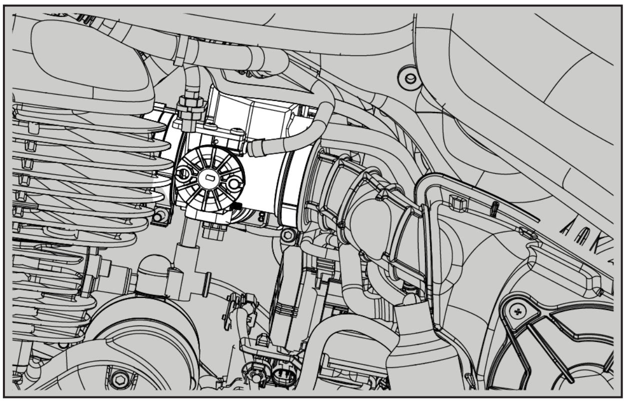
(i) Information : Crank sensor circuit fault / Crank sensor internal fault

b.Preliminary Checks (Basic Check Points):

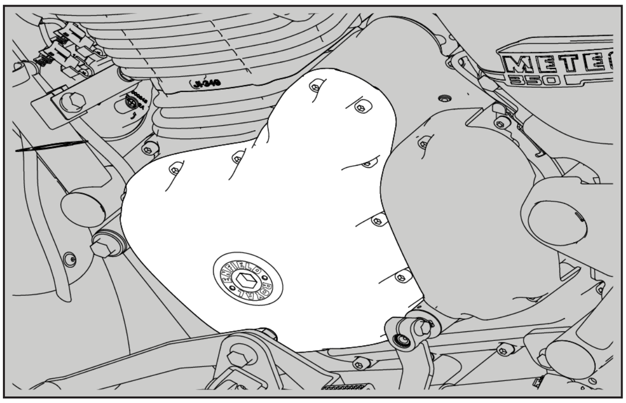
⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

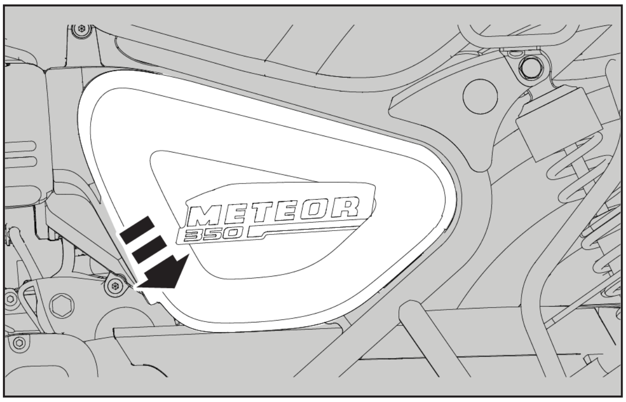
- ECU is located on the throttle body assembly



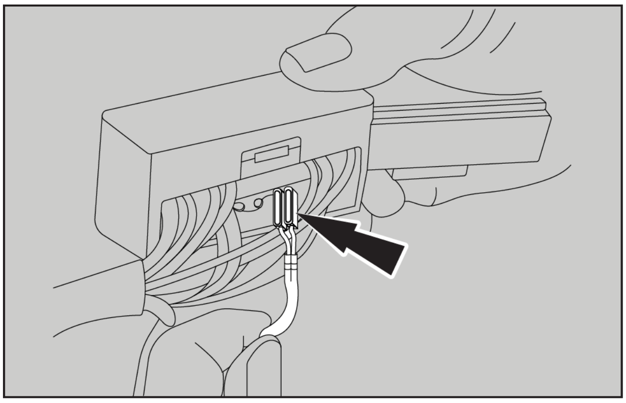
- The crank sensor is located on Left side engine crankcase



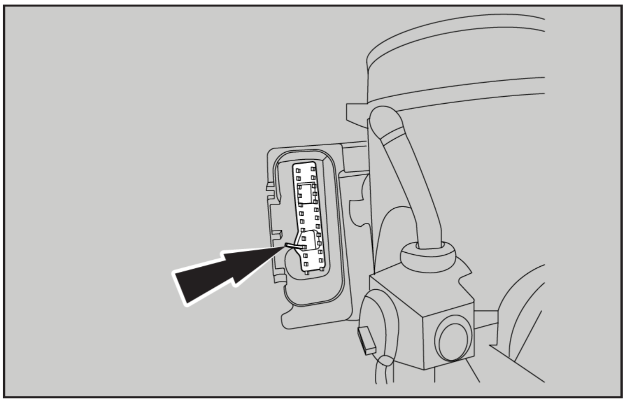
- Crank sensor coupler is located inside LH side panel bottom side



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition “ON” & “OFF”) till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

“ REFRESH DTC OPTION HAS TO APPEAR HERE”

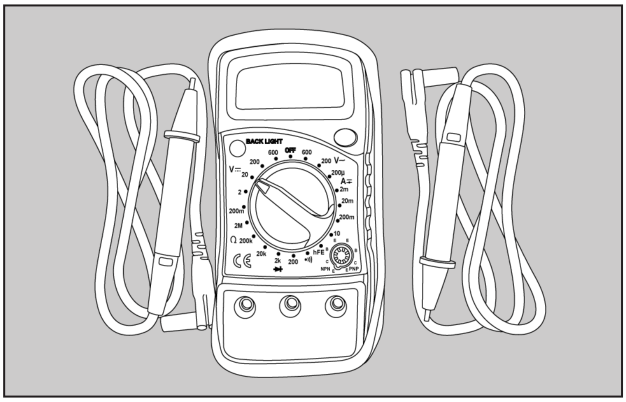
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

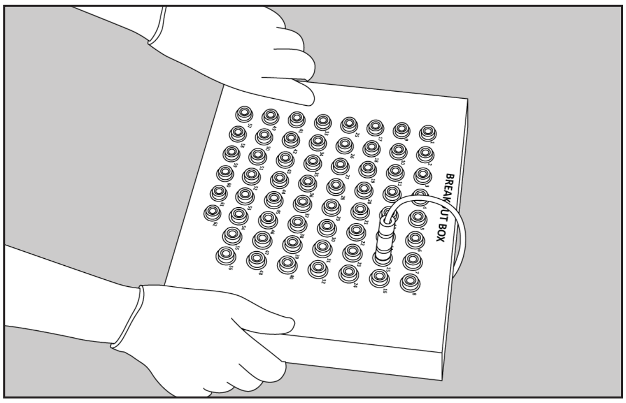
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

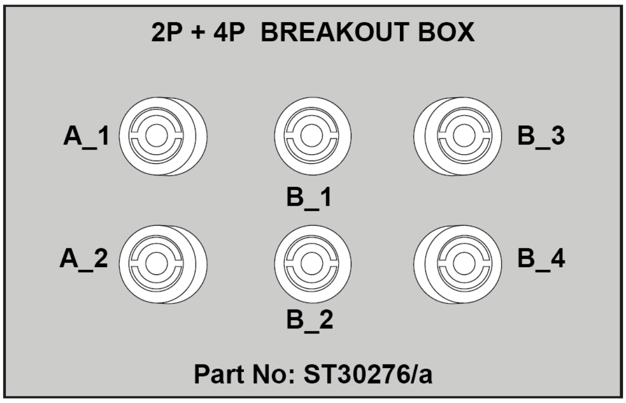
- **Tools Required**
- Multimeter (Universal)



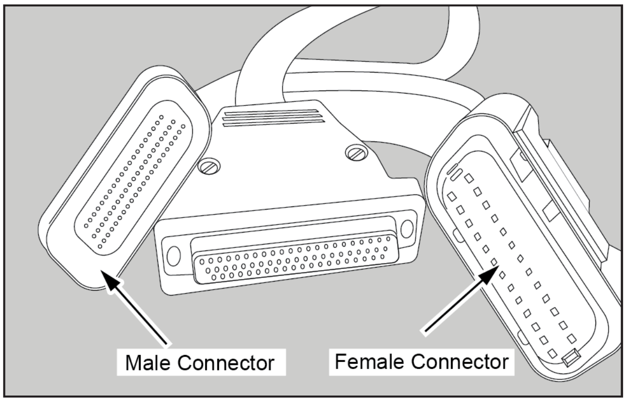
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

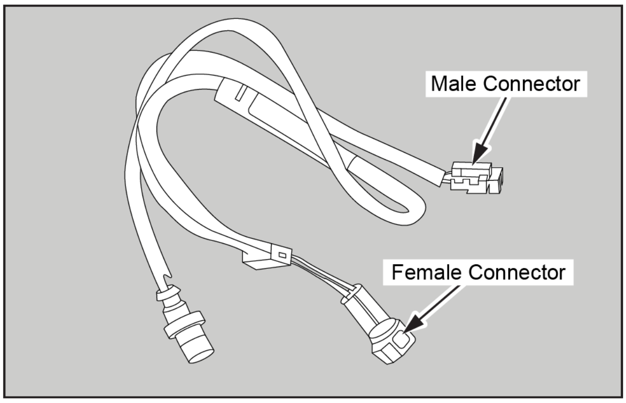
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

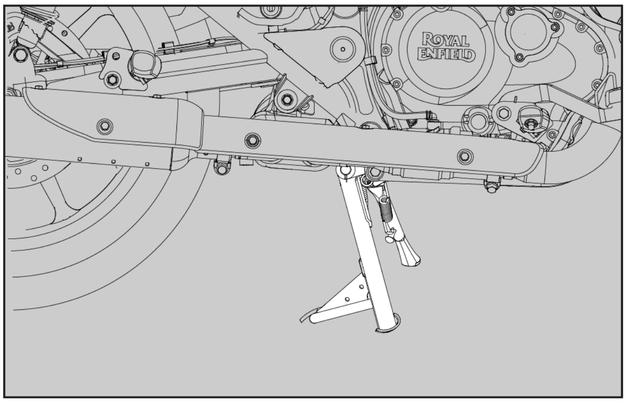

Male Connector
Female Connector

- EOT,Crank position, ignition coil -Sensor breakout box harness-2 pin ST30280/A

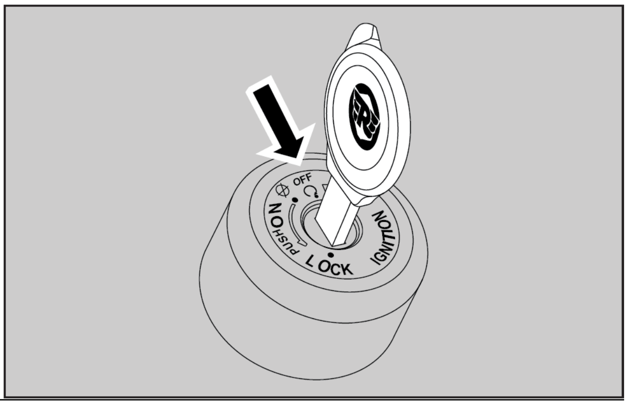

Male Connector
Female Connector

b. Pre-Checks:

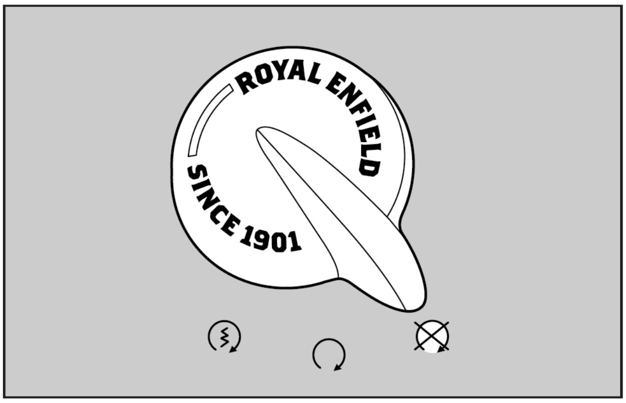
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less-Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**

⚠ CAUTION

- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU**

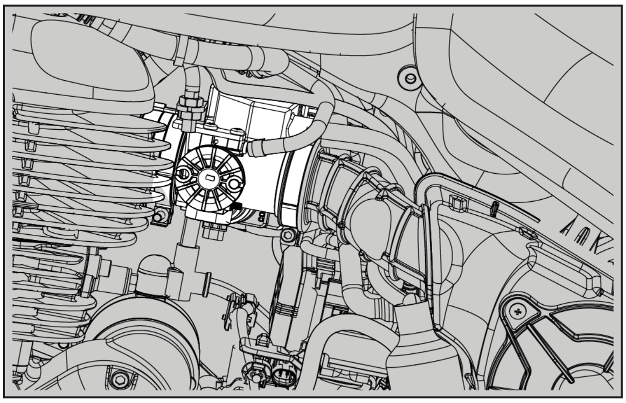
NOTE

- *Remove Left side panel to access the crank sensor coupler.*

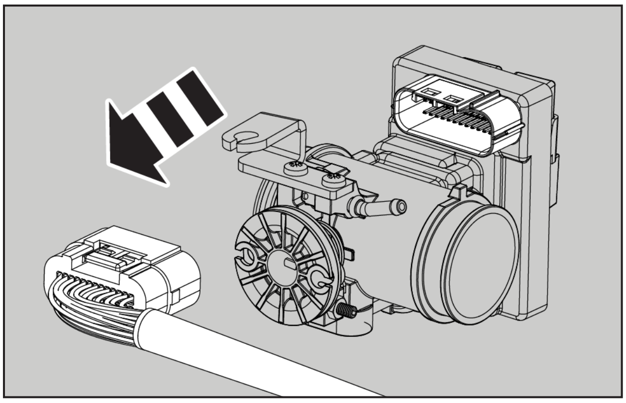
NOTE

- *Removal & refitment procedure of the left side panel is mentioned here as a hyperlink (exclusive service manual)*

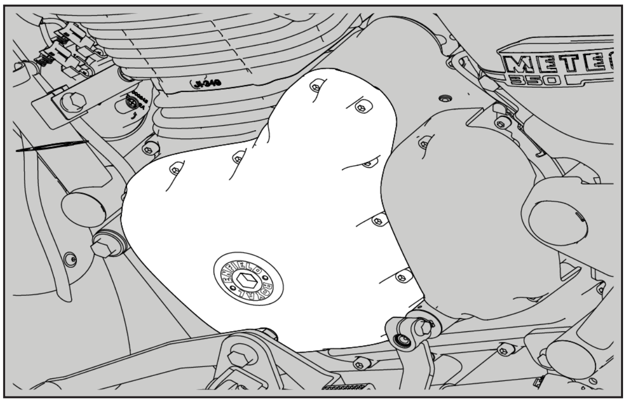
- ECU is located in the throttle body Assembly



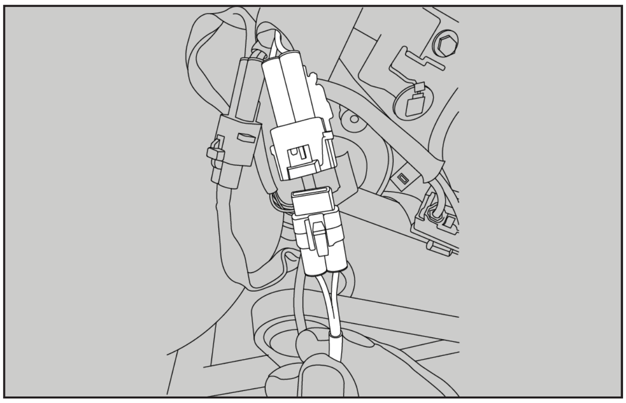
- Disconnect ECU from ECU coupler.



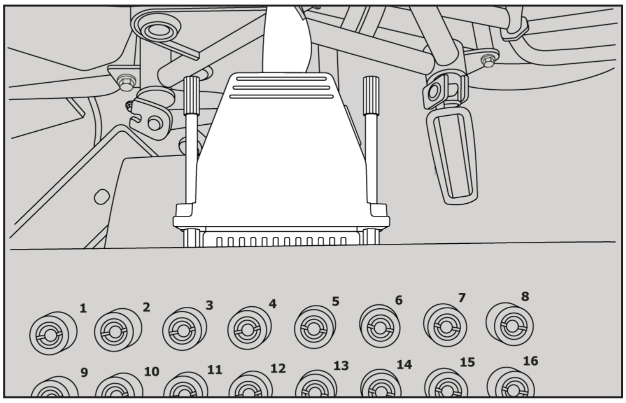
- Crank sensor is located on the Left side engine case



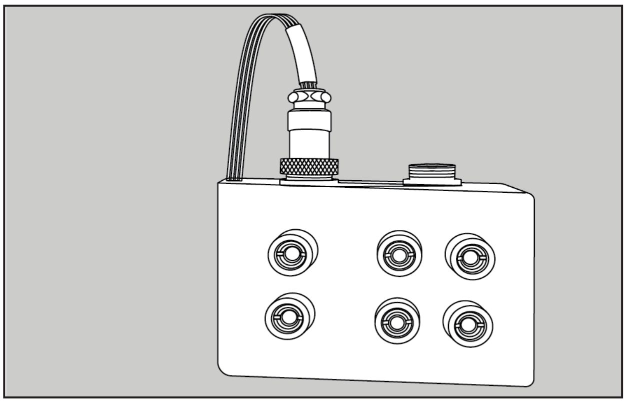
- Disconnect Crank position sensor from wiring harness coupler (black color coupler)



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness

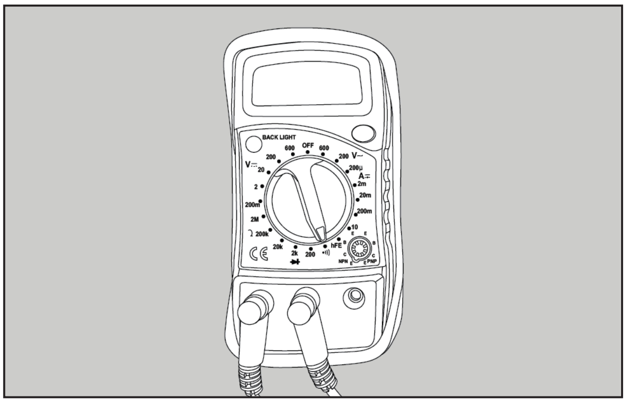

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

- Connect sensor Breakout Box (2P+4P Pin) to Crank position sensor breakout box harness kit

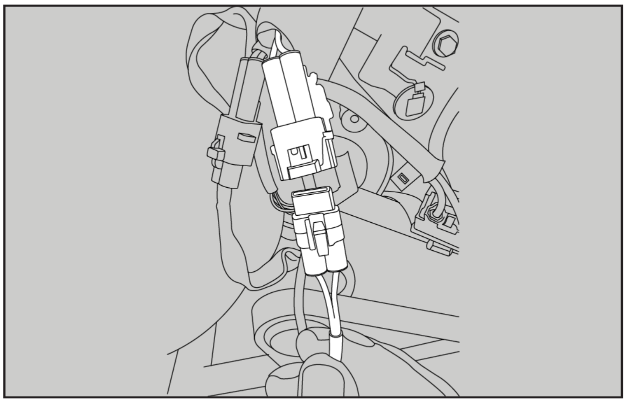


To Check Continuity of Wiring harness

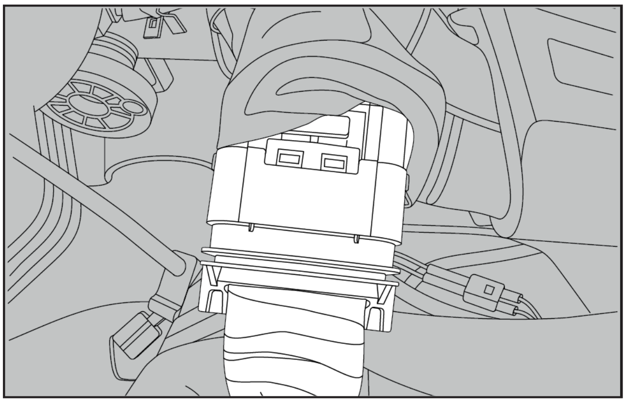
- Keep the multimeter in Continuity mode


BACK LIGHT
OFF
600
200
V
A
hFE
NPN
PNP

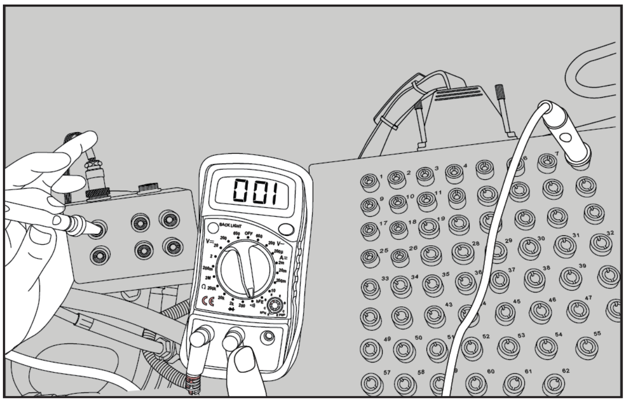
- Connect the crank position Sensor breakout box harness to Crank position sensor wiring harness coupler



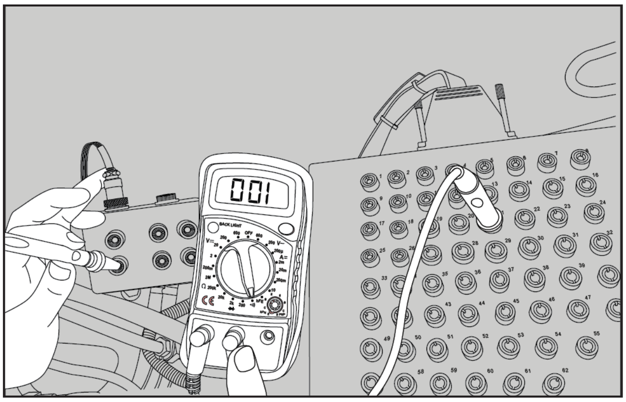
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in socket 8 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

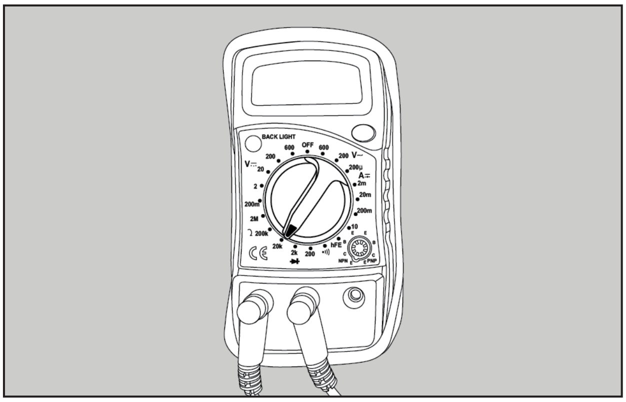


- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 21 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

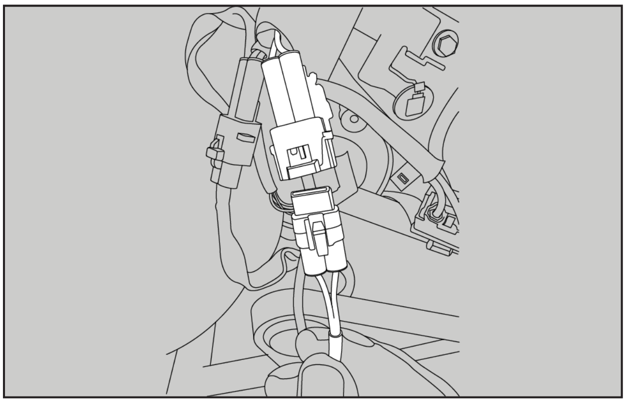


To Check the Resistance

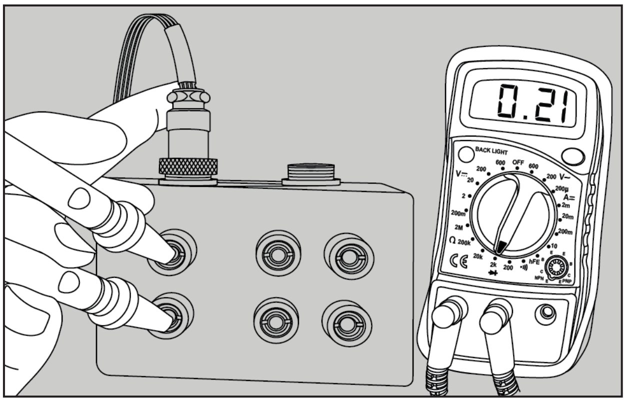
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Crank position sensor breakout box harness to the Crank position sensor coupler



- To check the Resistance value of the Crank position sensor, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box The resistance value is to be 205 to 225 Ohms @ 25+5°c



VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness
- If the resistance is not within the specified limit (205 to225 Ohms), you replace with the Stator coil
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

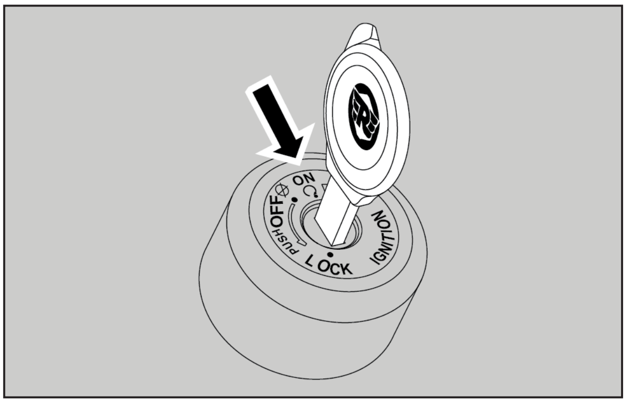
It is recommended to replace the sensor /ECU / Wiring harness as per the advice from Royal Enfield only.

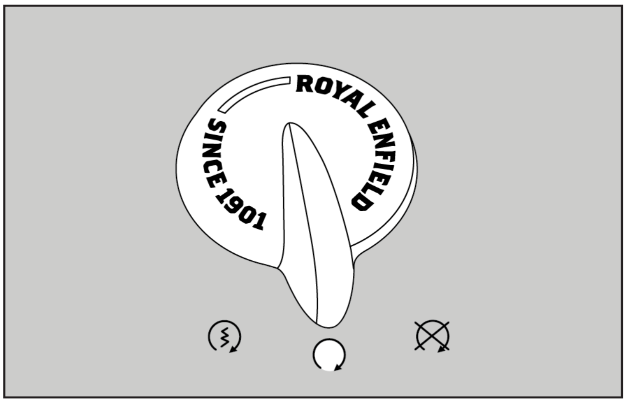
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

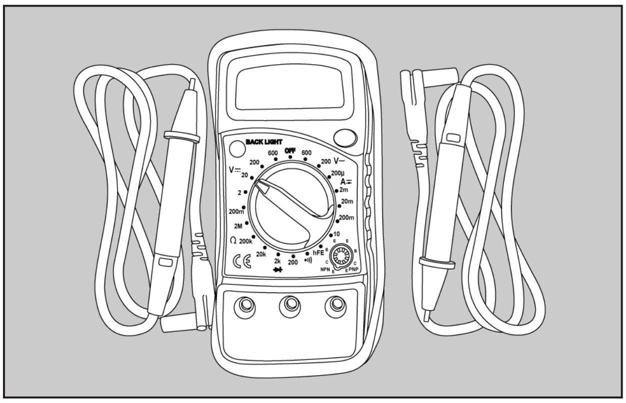
1.3. TEST LEAD WIRE METHOD:

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump-starting, etc.**

Tools Required

- Multimeter (Universal)

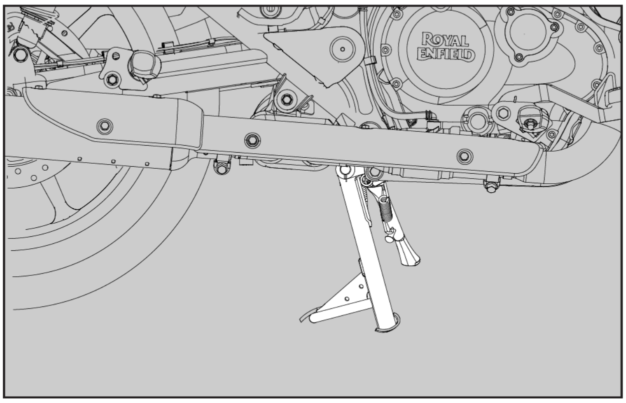


- Test lead wire (90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - Hyperlink will be given here to the chart

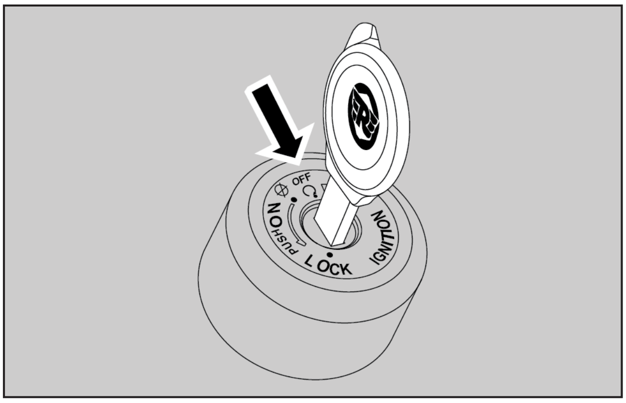
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1.Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 7.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

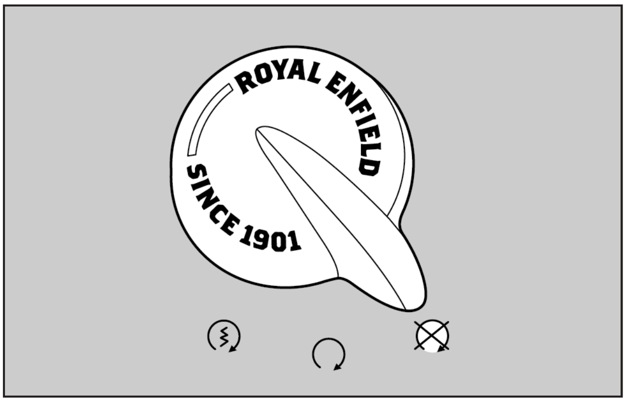
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

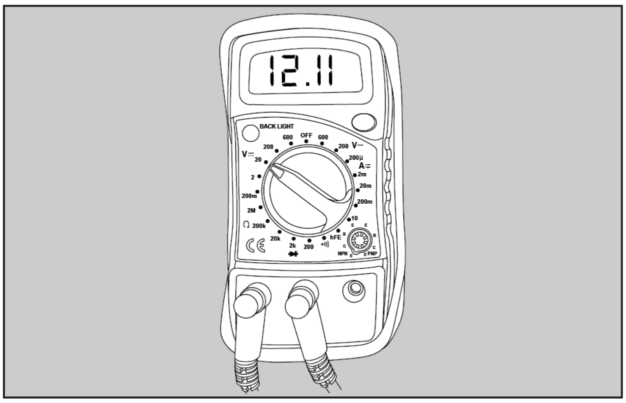


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

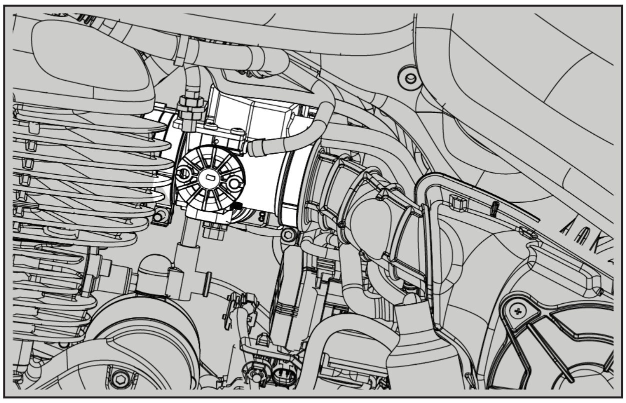
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

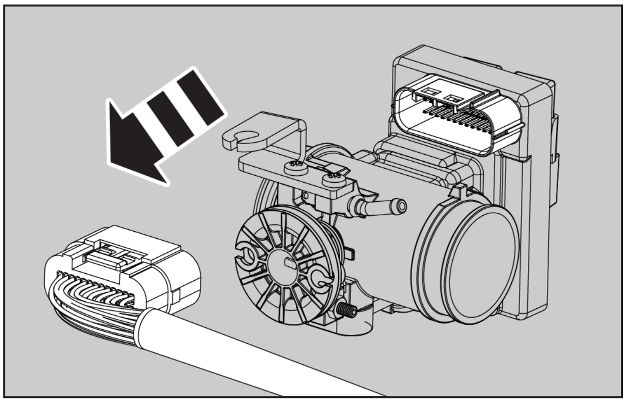
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

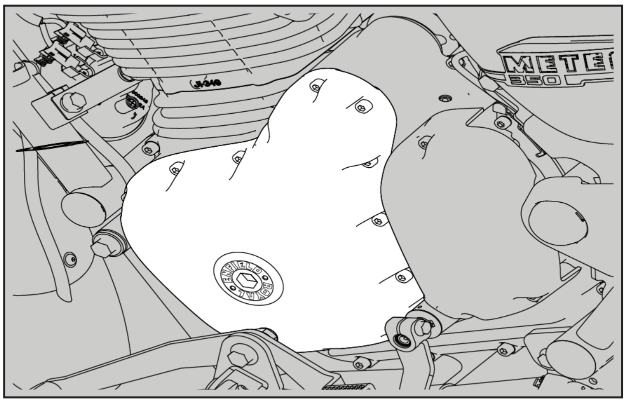
- ECU is located on the throttle body assembly



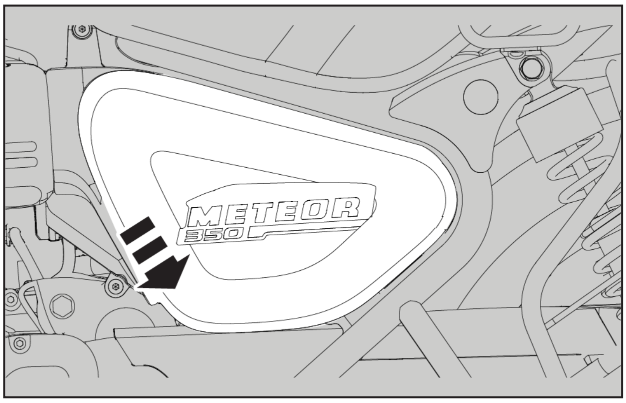
- Disconnect ECU from ECU wiring harness coupler

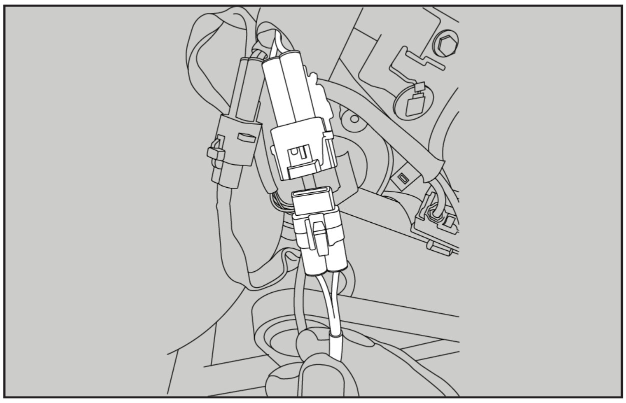


- Crank sensor coupler is located inside RH side panel bottom end



- Disconnect the Crank position sensor coupler (Black coupler).

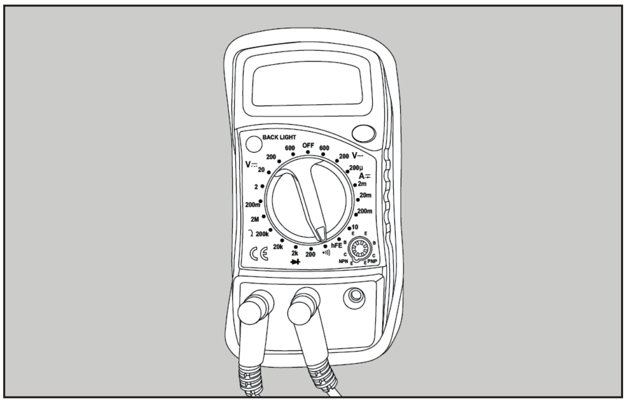




To check the Continuity of the wiring harness

STEP 1

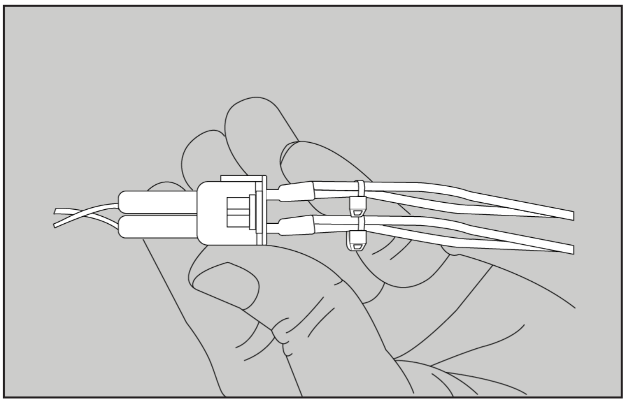
- Keep the multimeter in continuity mode.



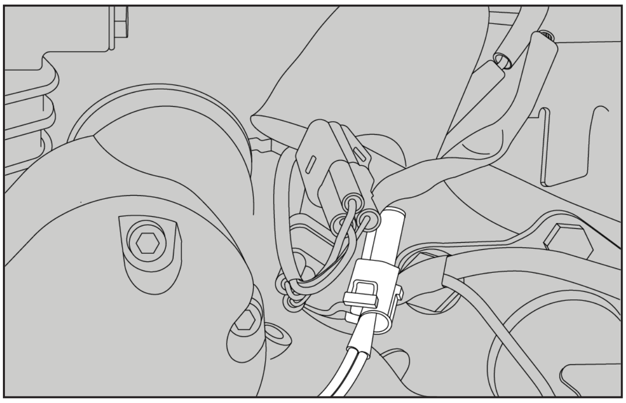
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor wiring harness coupler.

90 series (Orange Color) test lead wire with the black tag in Pin 1 of Crank position sensor wiring harness socket

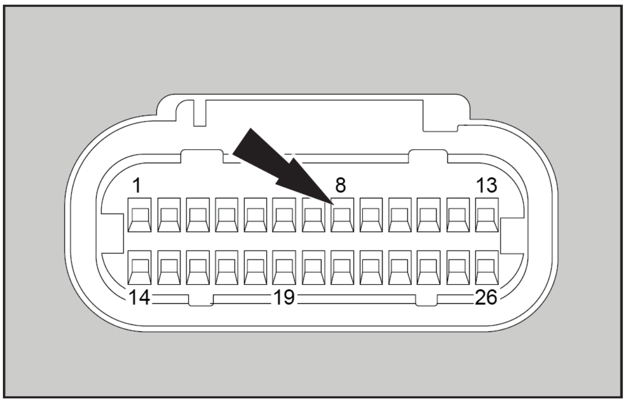
90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor wiring harness socket



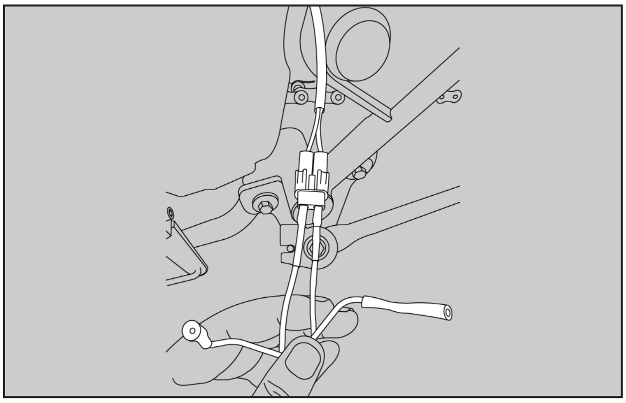
- Keep the multimeter positive probe to Pin 1 (90 series test lead wire with black tag) of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

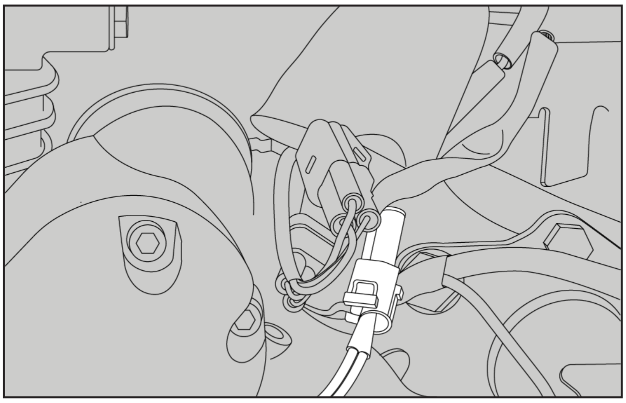


- Keep the multimeter negative probe in Pin 8 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

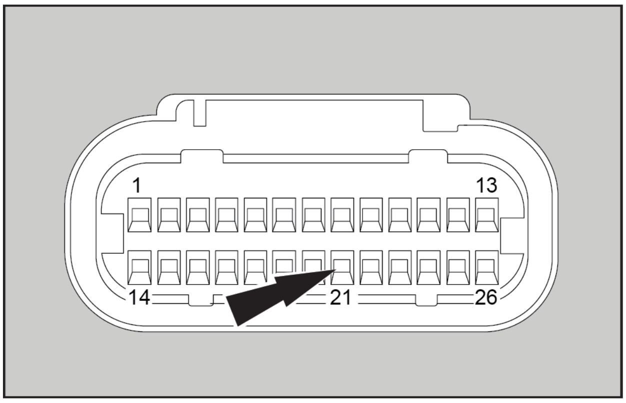


STEP 2

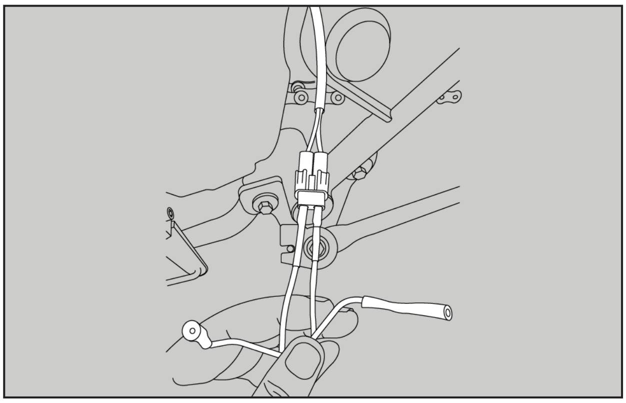
- Keep the multimeter positive probe to Pin 2 of 90 series (Orange Color) test lead wire with red tag of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 21 of the ECU wiring harness coupler



- Keep the multimeter negative probe in Pin 21 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

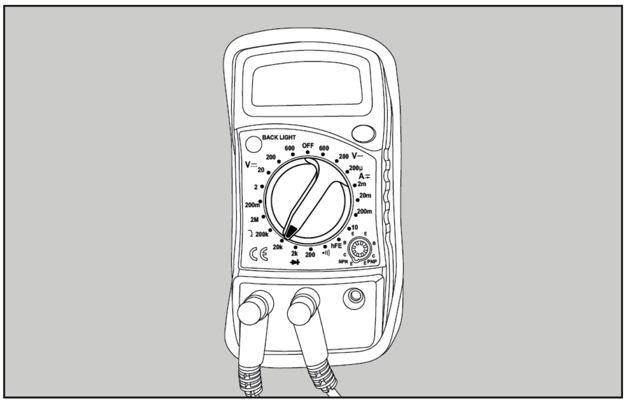


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Resistance

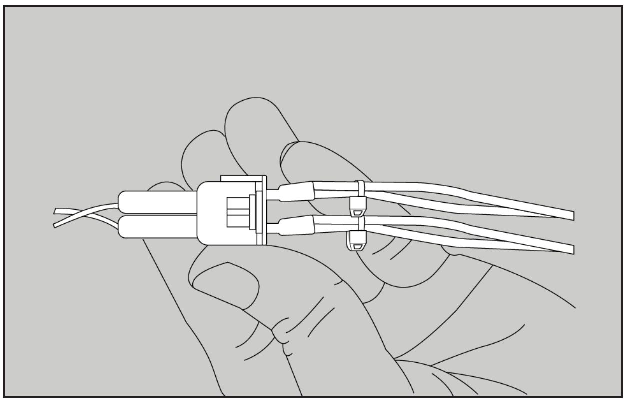
- Keep the multimeter in Resistance mode (2K ohms)



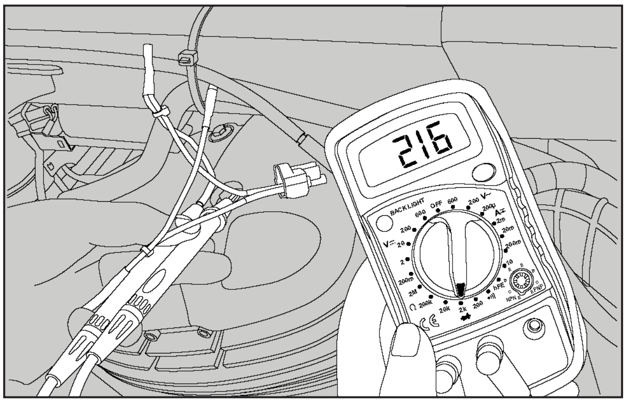
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor coupler.

90 series (orange color) test lead wire with the black tag in Pin 1 of Crank position sensor coupler

90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor coupler



- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and negative probe in Pin 2 (90 series test lead wire with red tag). Resistance value to be 205 to 225 Ohms.



⚠ CAUTION

Please ensure while disconnecting and connecting test lead wire to the couplers, ensure there is no bend or damage.

VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (205 – 225 Ohms), you replace it with the Stator coil.
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

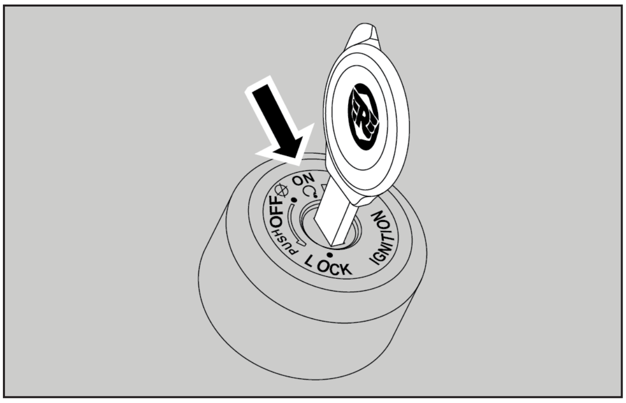
It is recommended to replace the sensor /ECU / wiring harness as per the advice from Royal Enfield only.

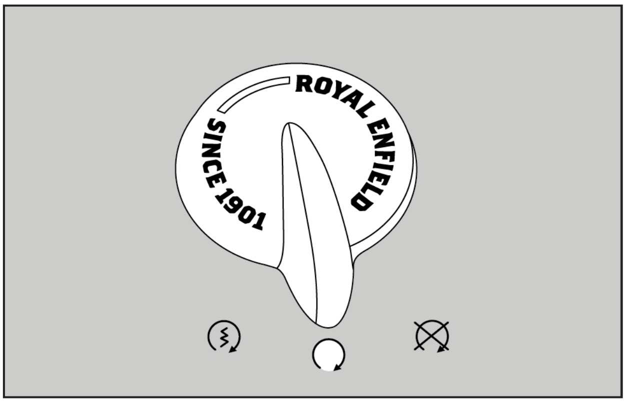
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0339- CRANK SENSOR

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0339	Crank sensor	Crank sensor gap position is incorrect

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Crank sensor is also called as pulsar coil

TROUBLE CODE : DTC CODE: P0339

Type of error : Crank sensor gap position is incorrect

(i) Information : Crank sensor circuit fault / Crank sensor internal fault

b.Preliminary Checks (Basic Check Points):

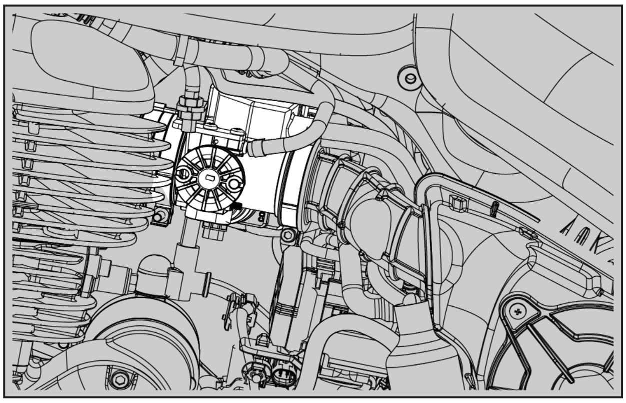
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

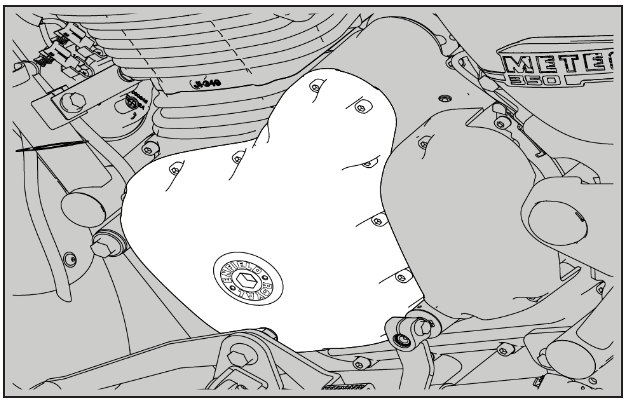
⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

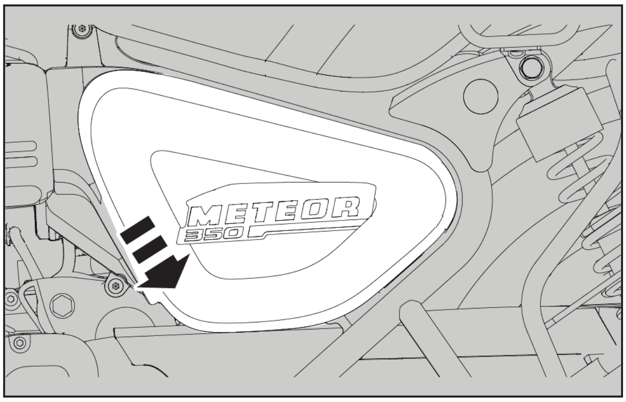
- ECU is located on the throttle body assembly



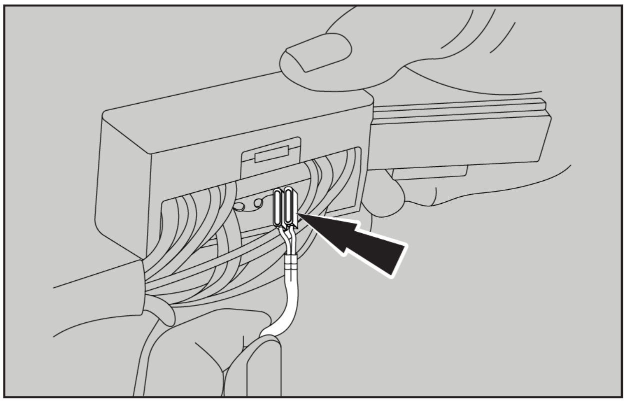
- The crank sensor is located on Left side engine crankcase



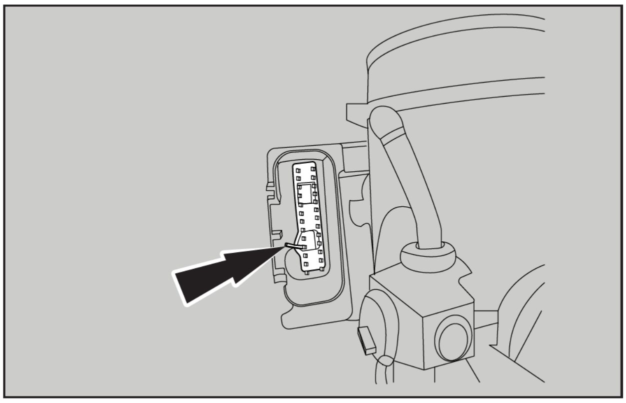
- Crank sensor coupler is located inside LH side panel bottom side



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

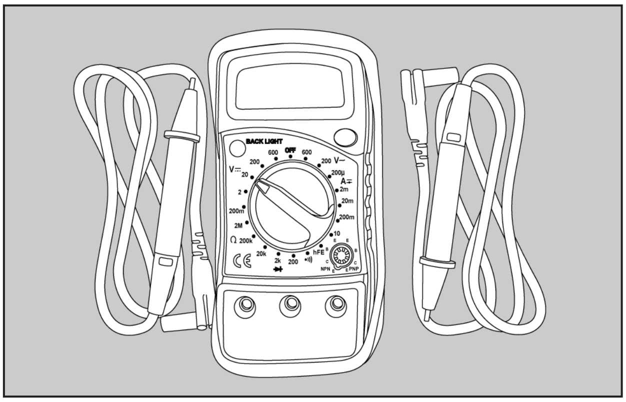
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

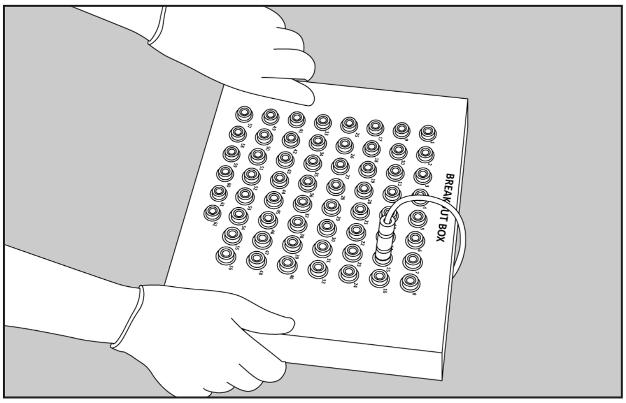
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

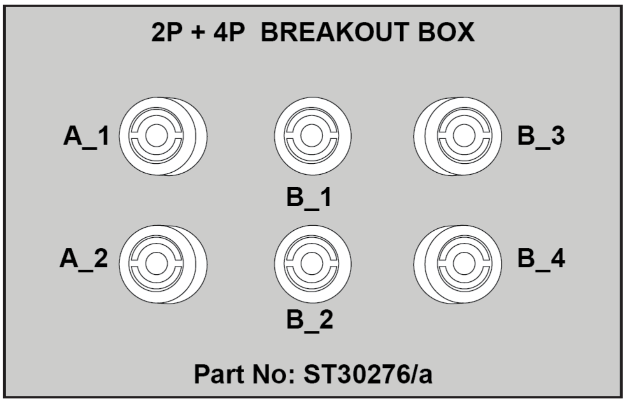
- **Tools Required**
- Multimeter (Universal)



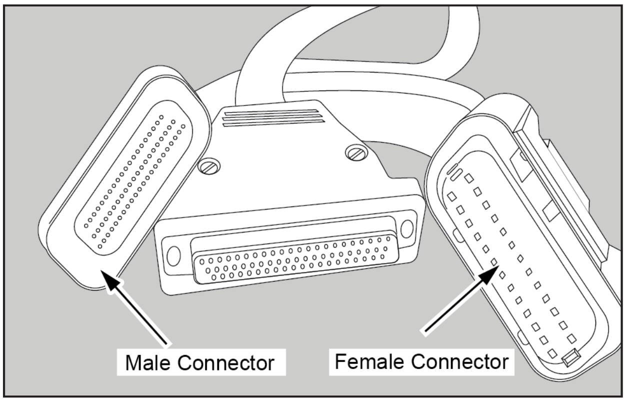
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

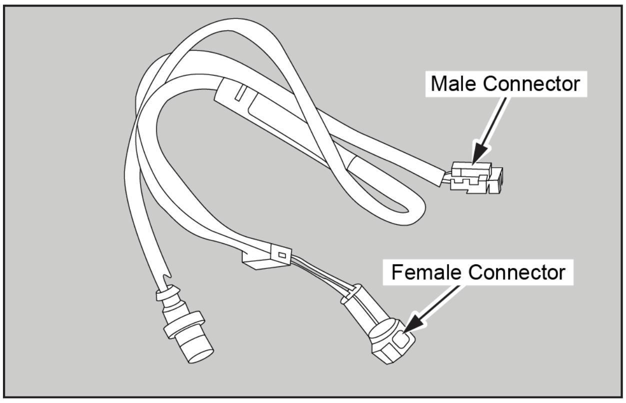
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

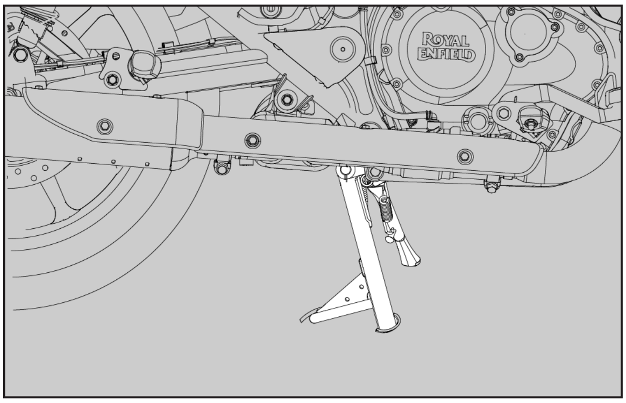

Male Connector
Female Connector

- EOT,Crank position, ignition coil -Sensor breakout box harness-2 pin ST30280/A

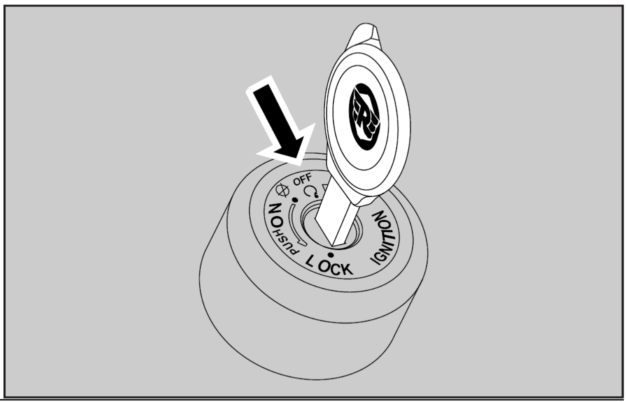

Male Connector
Female Connector

b. Pre-Checks:

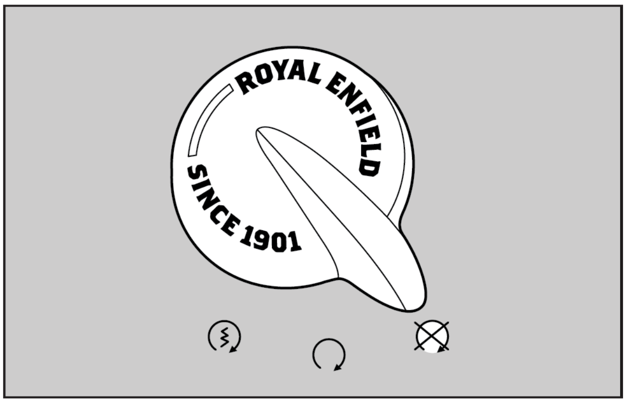
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less-Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition “ON” condition**

⚠ CAUTION

- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU**

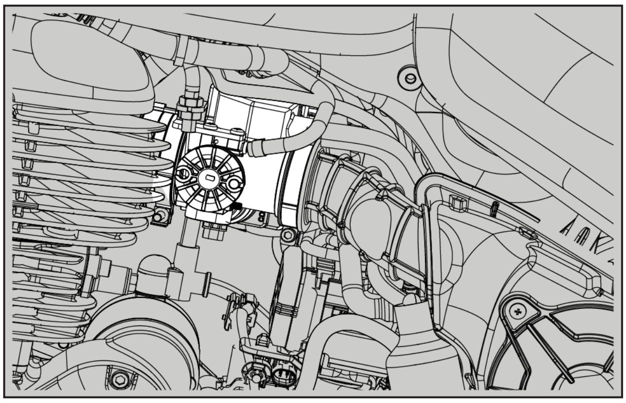
NOTE

- *Remove Left side panel to access the crank sensor coupler.*

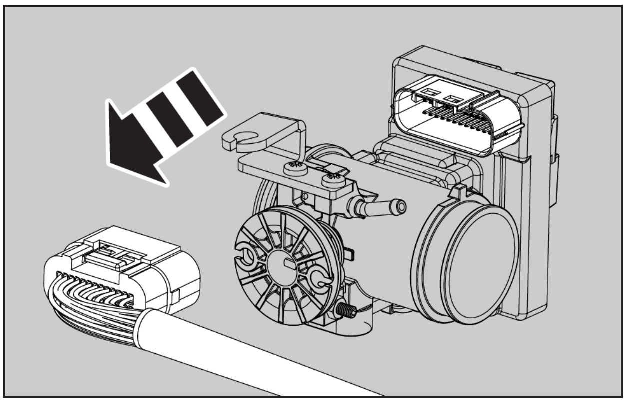
NOTE

- *Removal & refitment procedure of the left side panel is mentioned here as a hyperlink (exclusive service manual)*

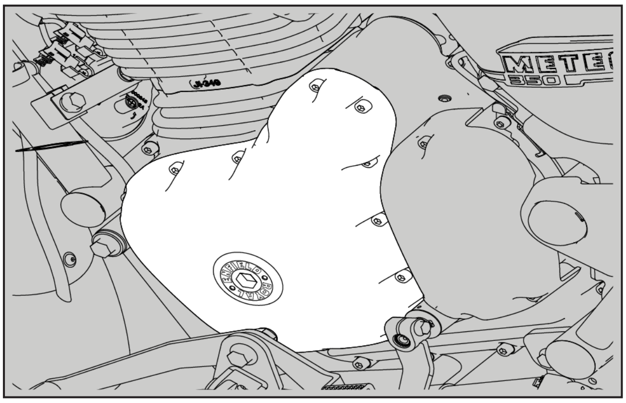
- ECU is located in the throttle body Assembly



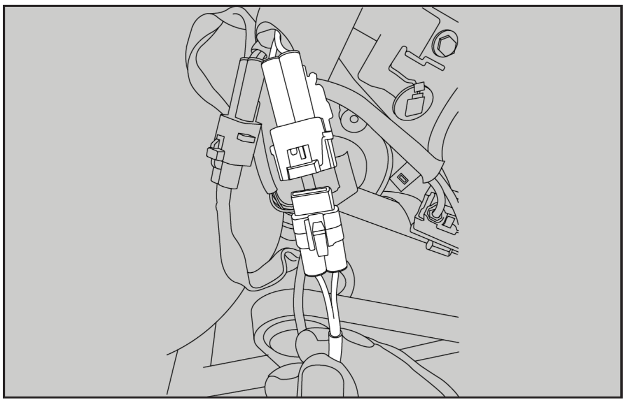
- Disconnect ECU from ECU coupler.



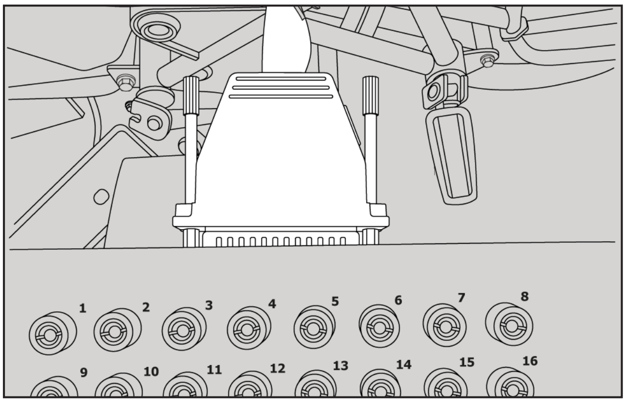
- Crank sensor is located on the Left side engine case



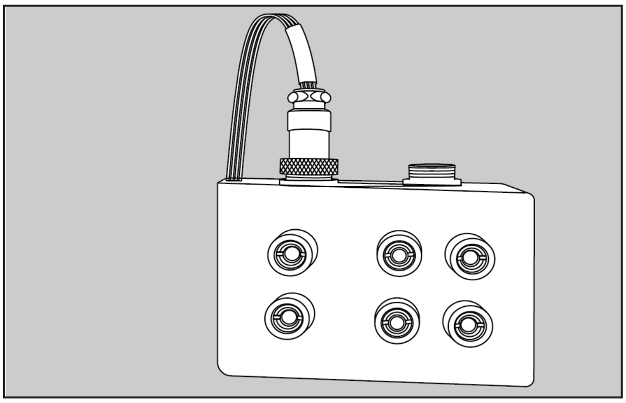
- Disconnect Crank position sensor from wiring harness coupler (black color coupler)



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness

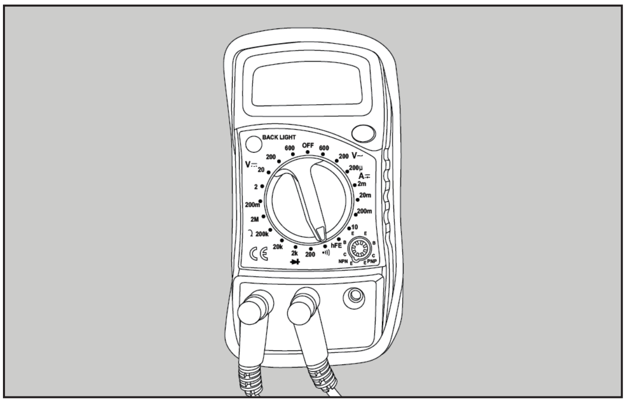

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

- Connect sensor Breakout Box (2P+4P Pin) to Crank position sensor breakout box harness kit

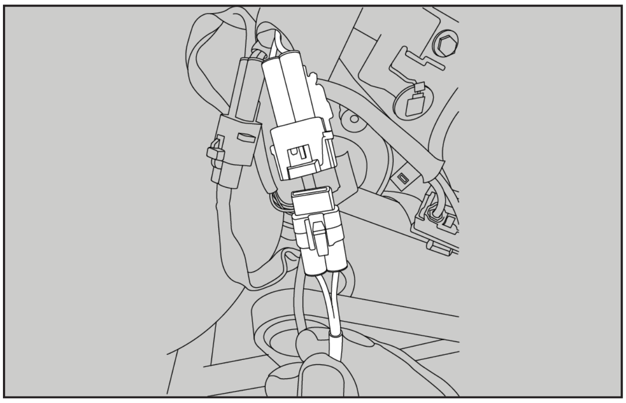


To Check Continuity of Wiring harness

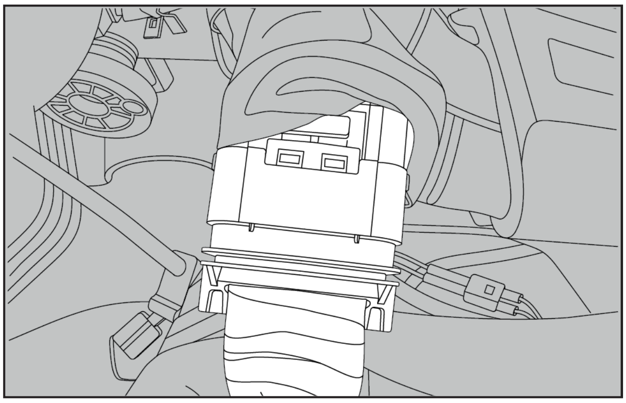
- Keep the multimeter in Continuity mode


BACK LIGHT
OFF
600
600
200
200
V
V
A
hFE
NPN
PNP

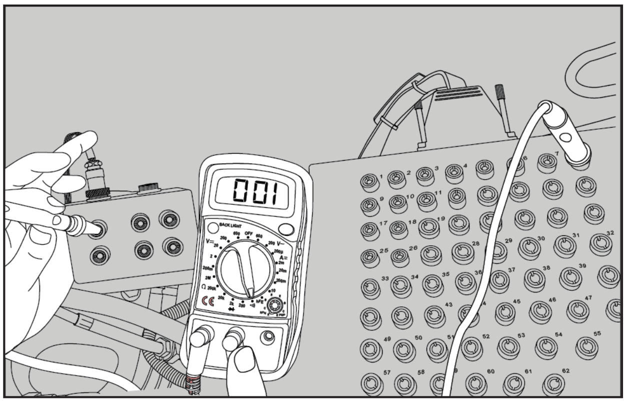
- Connect the crank position Sensor breakout box harness to Crank position sensor wiring harness coupler



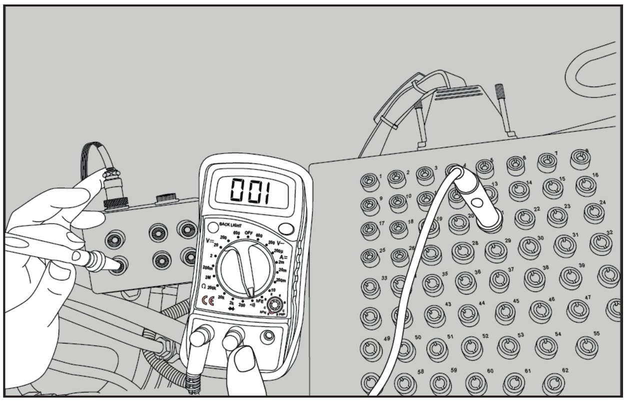
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in socket 8 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

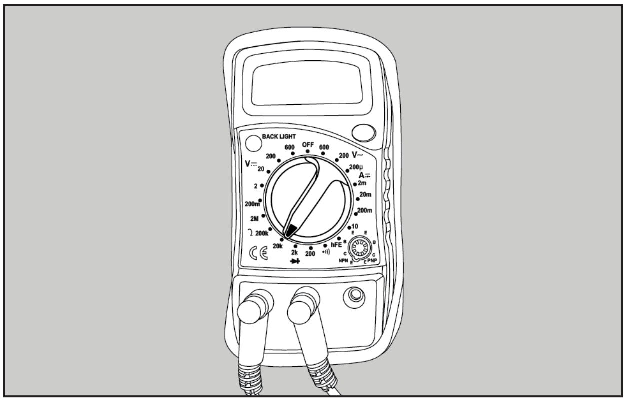


- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 21 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

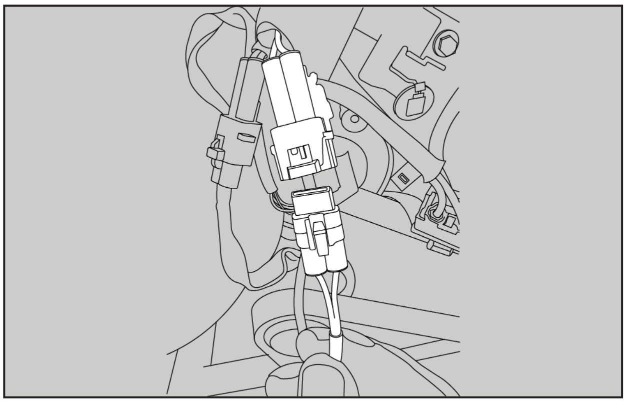


To Check the Resistance

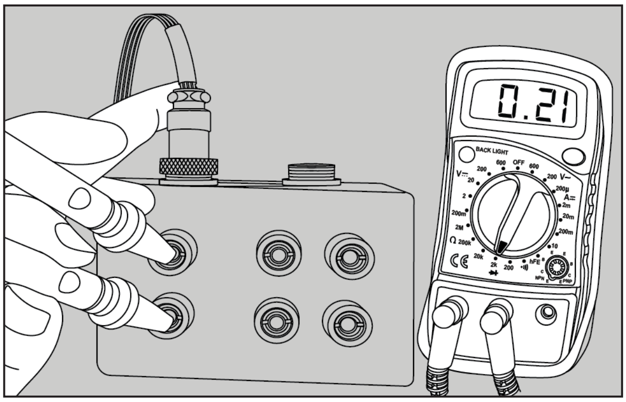
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Crank position sensor breakout box harness to the Crank position sensor coupler



- To check the Resistance value of the Crank position sensor, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box The resistance value is to be 205 to 225 Ohms @ 25+5°c



VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness
- If the resistance is not within the specified limit (205 to225 Ohms), you replace with the Stator coil
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

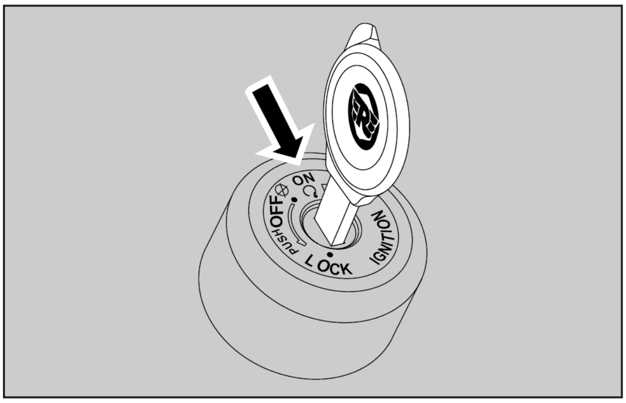
It is recommended to replace the sensor /ECU / Wiring harness as per the advice from Royal Enfield only.

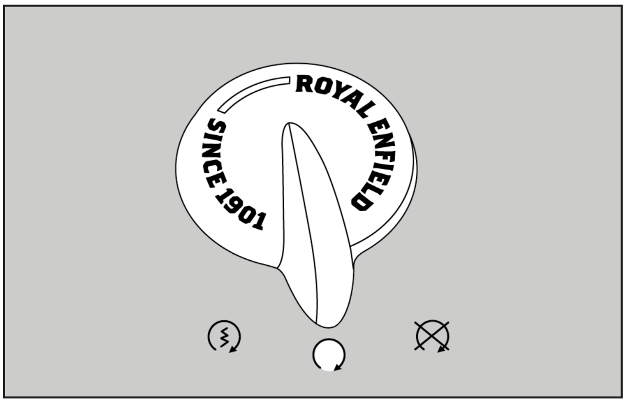
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

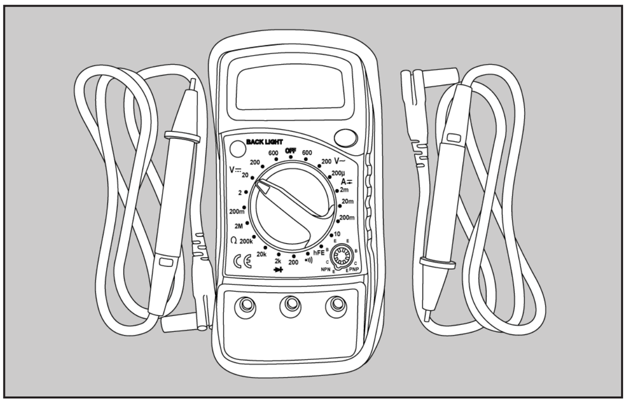
1.3. TEST LEAD WIRE METHOD:

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump-starting, etc.**

Tools Required

- Multimeter (Universal)

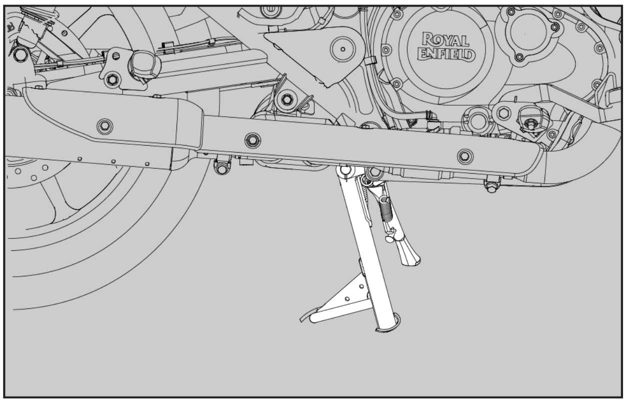


- Test lead wire (90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - Hyperlink will be given here to the chart

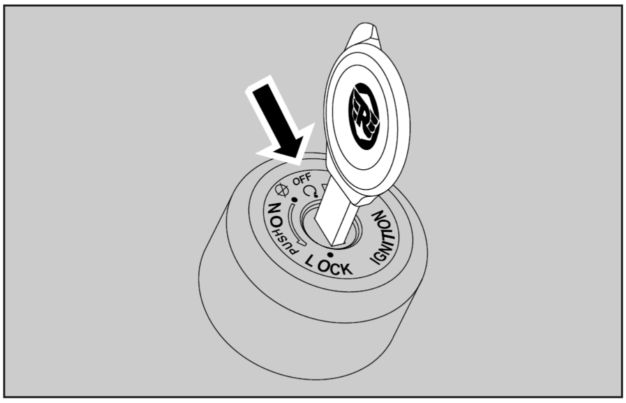
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1.Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 7.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

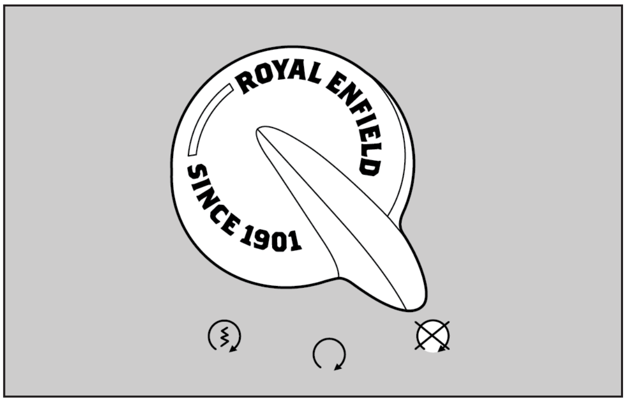
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

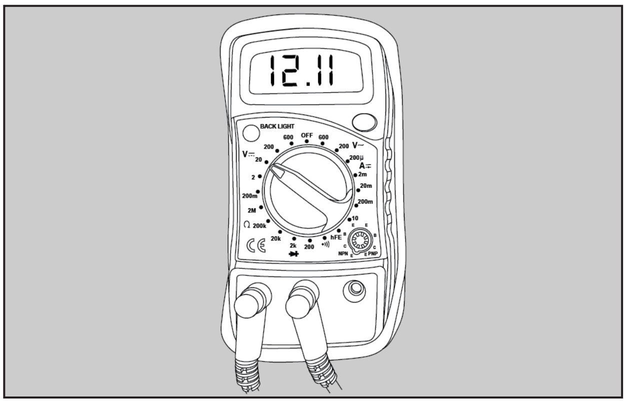


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

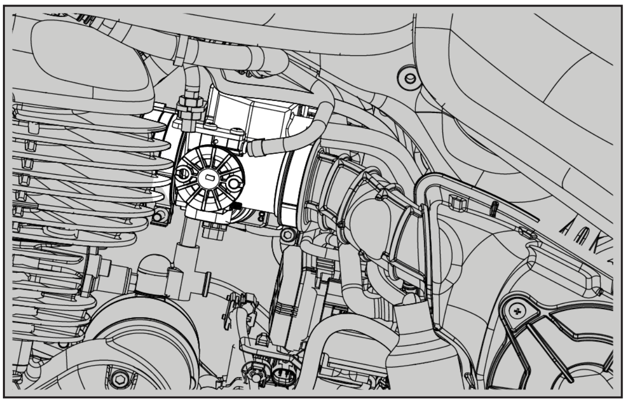
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

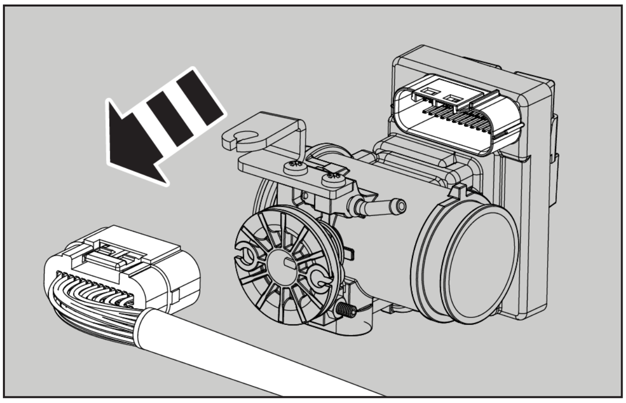
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

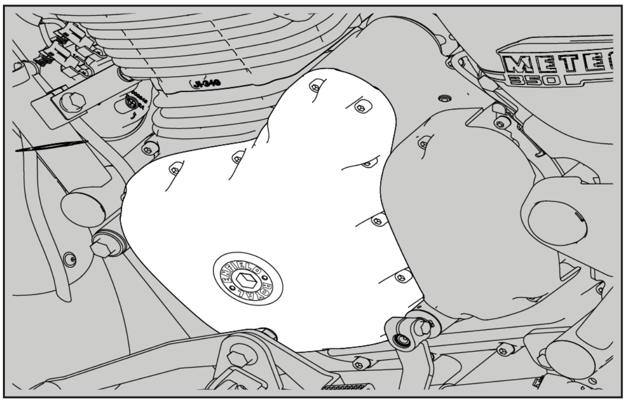
- ECU is located on the throttle body assembly



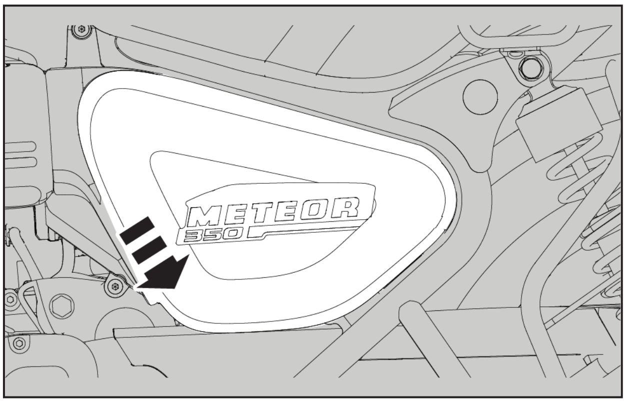
- Disconnect ECU from ECU wiring harness coupler

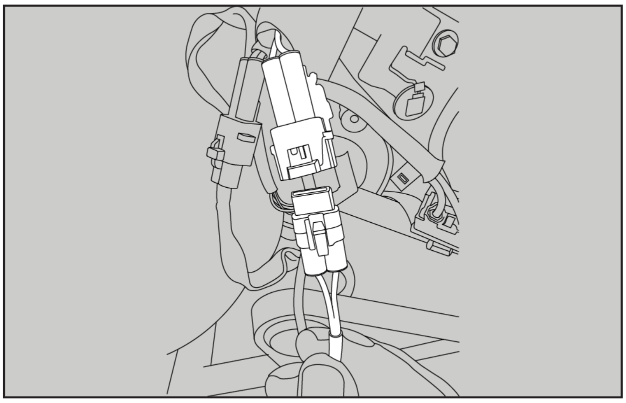


- Crank sensor coupler is located inside RH side panel bottom end



- Disconnect the Crank position sensor coupler (Black coupler).

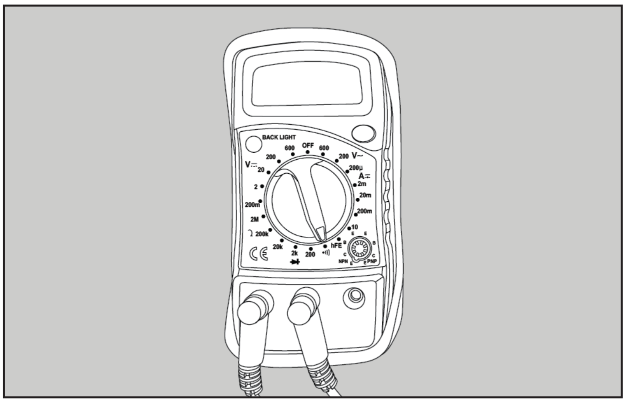




To check the Continuity of the wiring harness

STEP 1

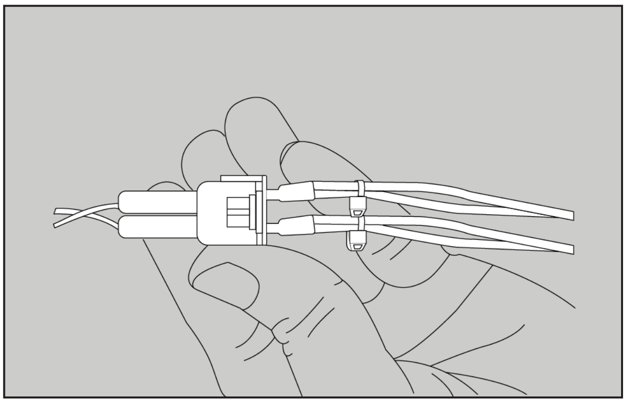
- Keep the multimeter in continuity mode.



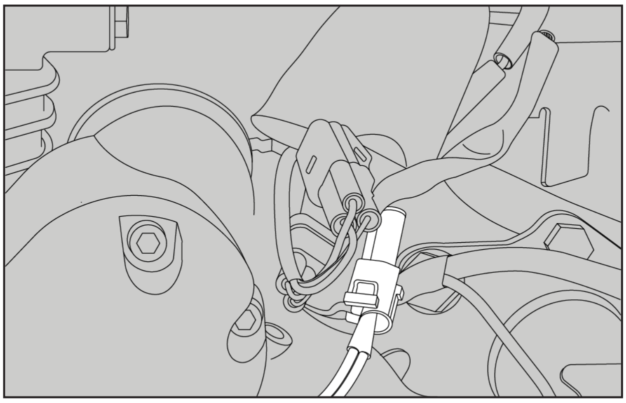
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor wiring harness coupler.

90 series (Orange Color) test lead wire with the black tag in Pin 1 of Crank position sensor wiring harness socket

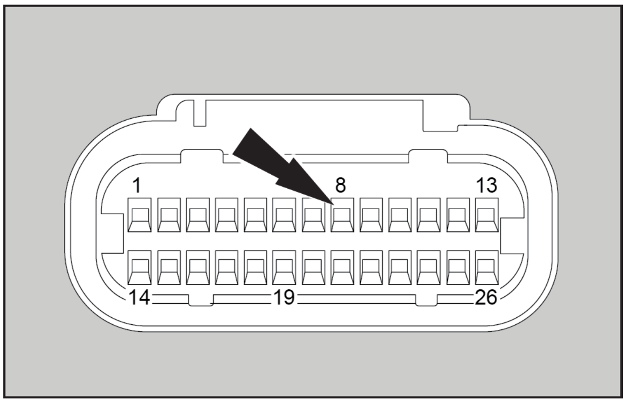
90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor wiring harness socket



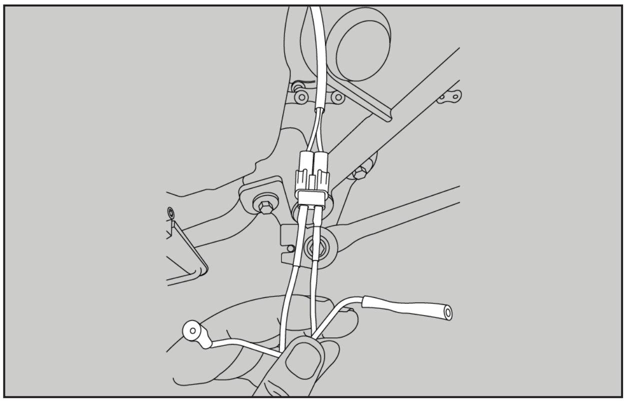
- Keep the multimeter positive probe to Pin 1 (90 series test lead wire with black tag) of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

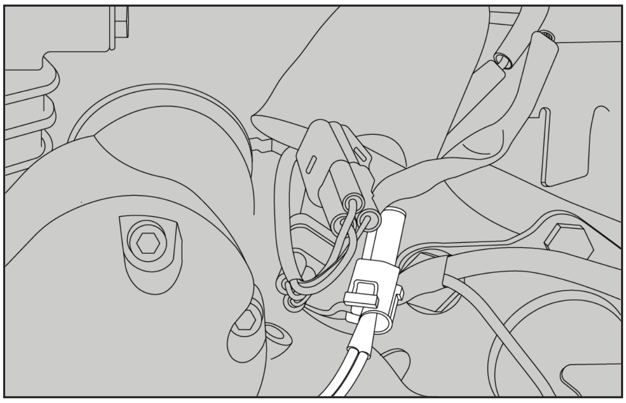


- Keep the multimeter negative probe in Pin 8 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

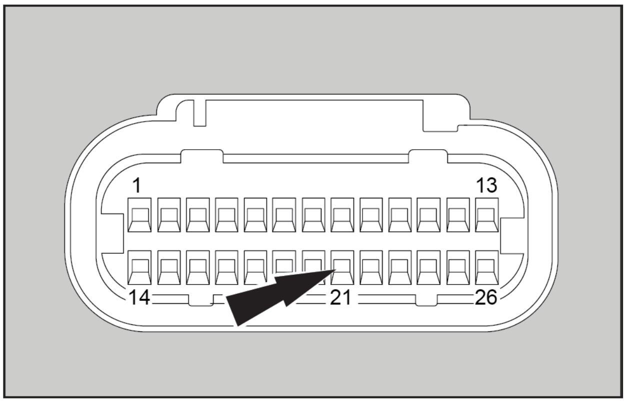


STEP 2

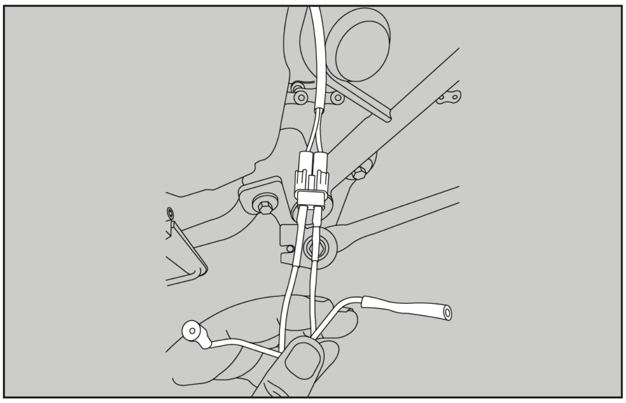
- Keep the multimeter positive probe to Pin 2 of 90 series (Orange Color) test lead wire with red tag of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 21 of the ECU wiring harness coupler



- Keep the multimeter negative probe in Pin 21 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

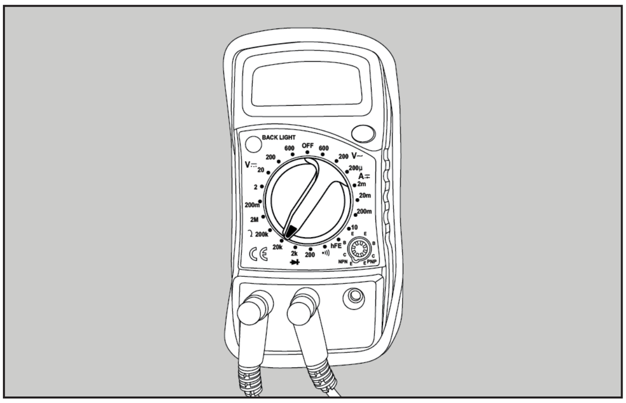


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Resistance

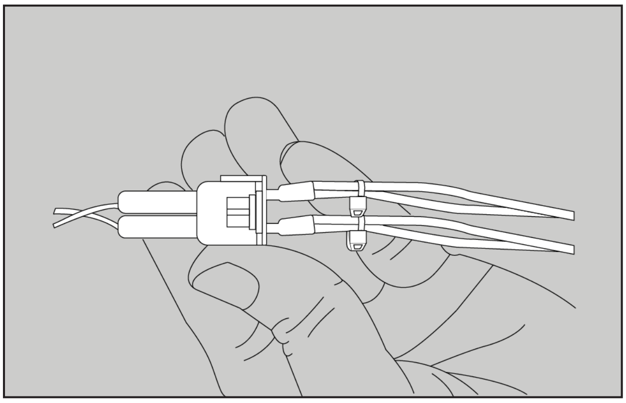
- Keep the multimeter in Resistance mode (2K ohms)



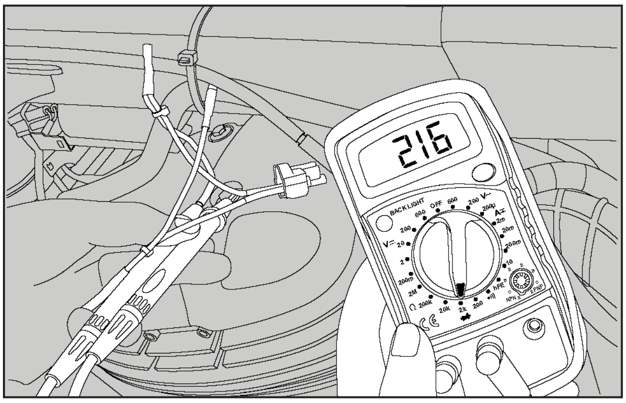
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor coupler.

90 series (orange color) test lead wire with the black tag in Pin 1 of Crank position sensor coupler

90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor coupler



- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and negative probe in Pin 2 (90 series test lead wire with red tag). Resistance value to be 205 to 225 Ohms.



⚠ CAUTION

Please ensure while disconnecting and connecting test lead wire to the couplers, ensure there is no bend or damage.

VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (205 – 225 Ohms), you replace it with the Stator coil.
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

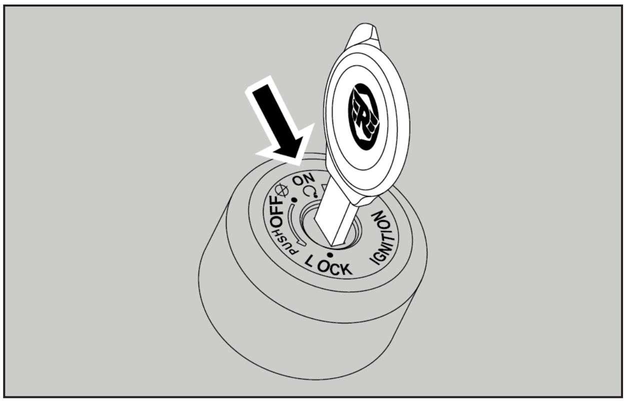
It is recommended to replace the sensor /ECU / wiring harness as per the advice from Royal Enfield only.

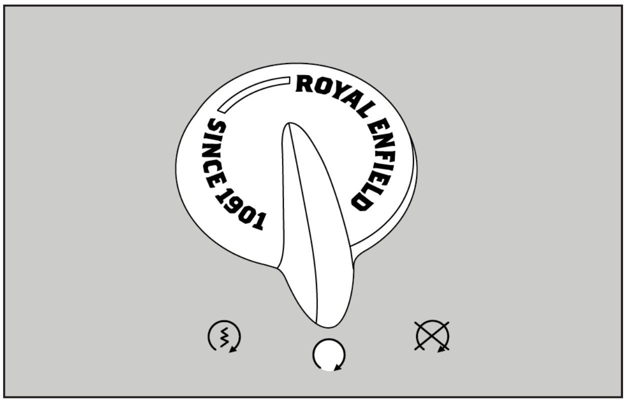
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0371- CRANK SENSOR DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0371	Crank sensor	Crank sensor additional tooth detected

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Crank sensor is also called as pulsar coil

TROUBLE CODE : DTC CODE: P0371

Type of error : Crank sensor additional tooth detected

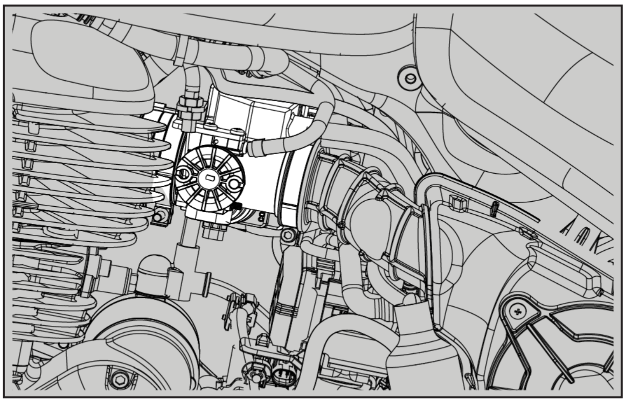
(i) Information : Crank sensor circuit fault / Crank sensor internal fault

b.Preliminary Checks (Basic Check Points):

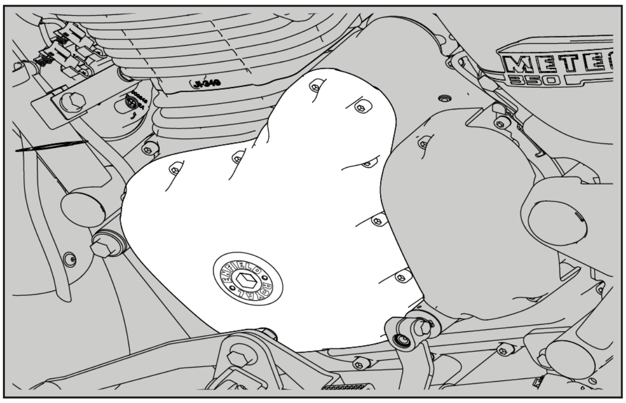
⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

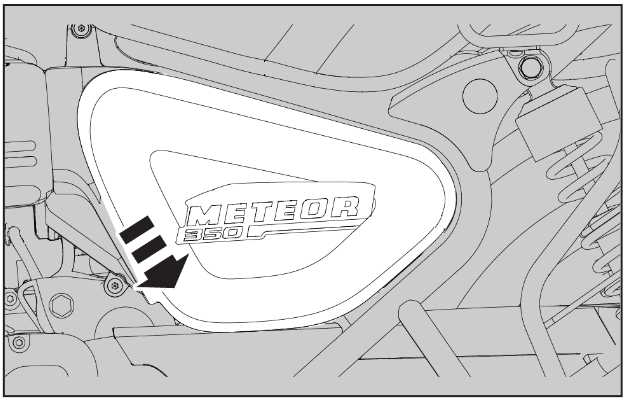
- ECU is located on the throttle body assembly



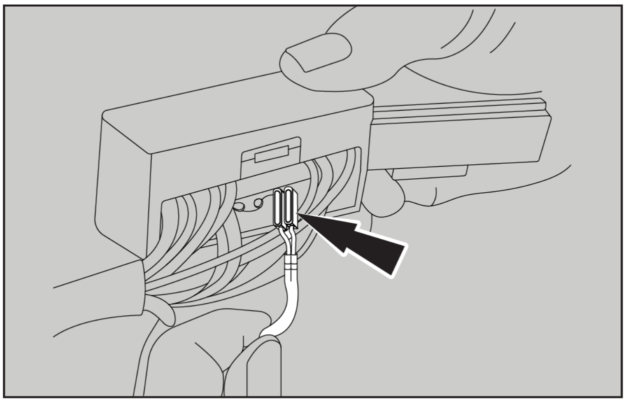
- The crank sensor is located on Left side engine crankcase



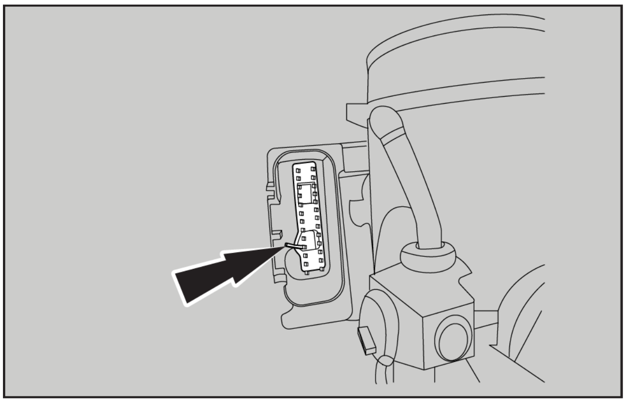
- Crank sensor coupler is located inside LH side panel bottom side



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

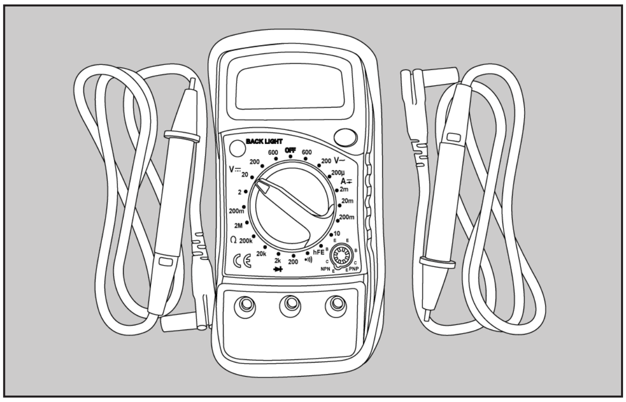
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

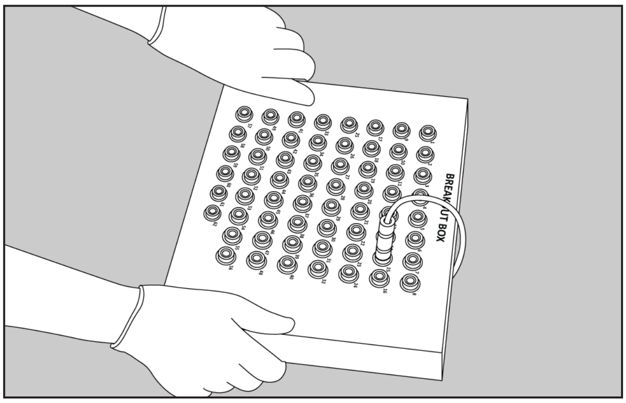
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

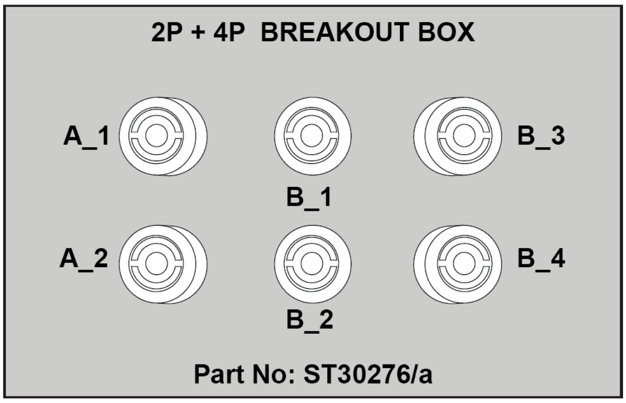
- **Tools Required**
- Multimeter (Universal)


BACK LIGHT
OFF

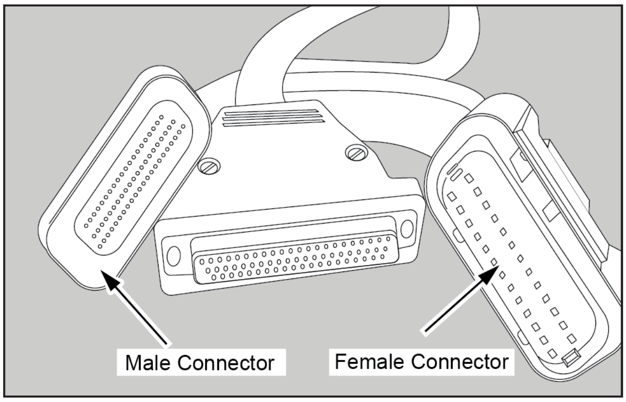
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

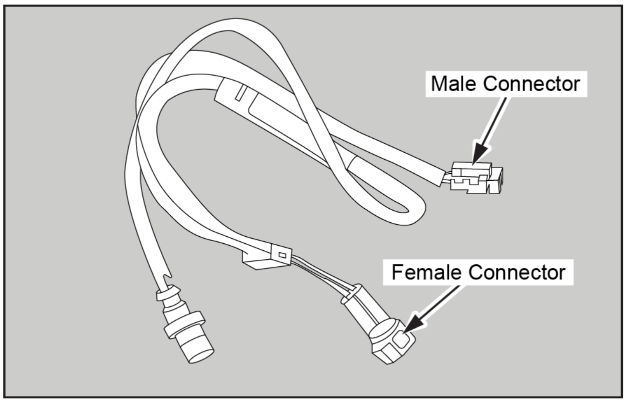
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

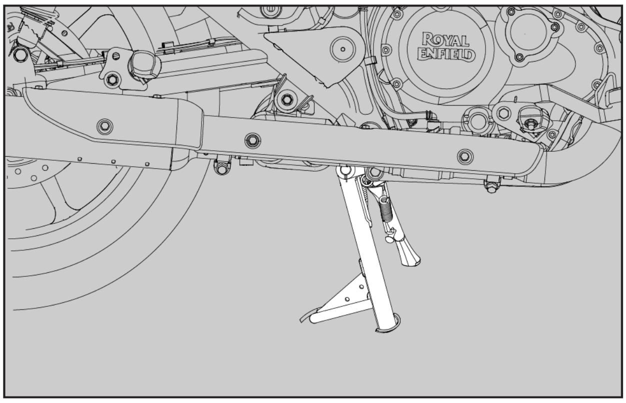

Male Connector
Female Connector

- EOT,Crank position, ignition coil -Sensor breakout box harness-2 pin ST30280/A

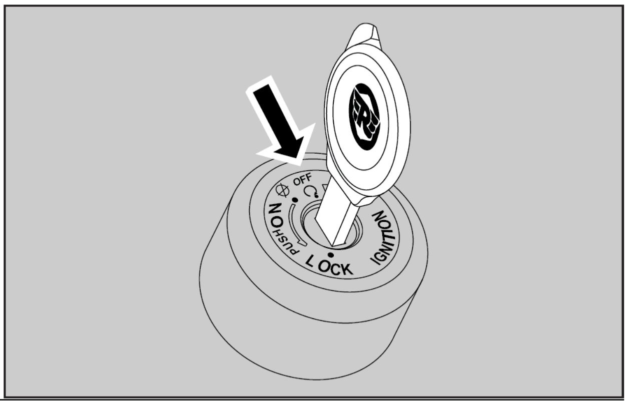

Male Connector
Female Connector

b. Pre-Checks:

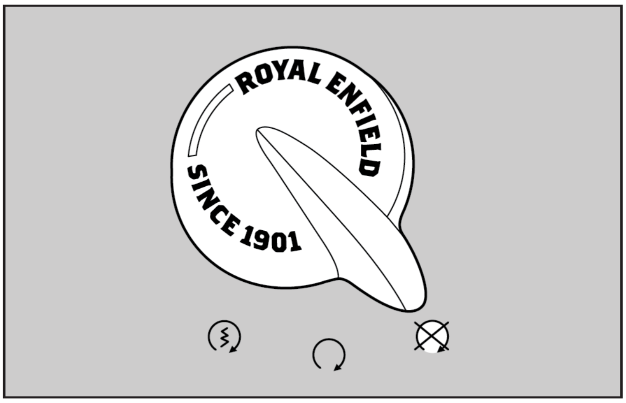
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less-Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**

⚠ CAUTION

- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU**

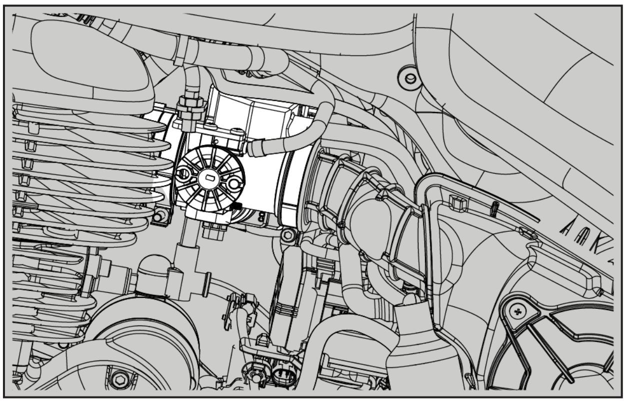
NOTE

- *Remove Left side panel to access the crank sensor coupler.*

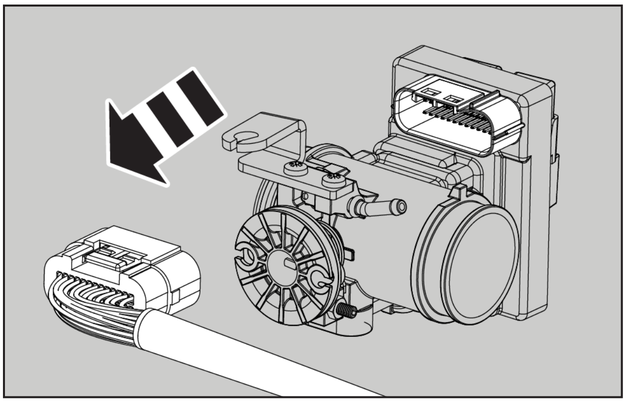
NOTE

- *Removal & refitment procedure of the left side panel is mentioned here as a hyperlink (exclusive service manual)*

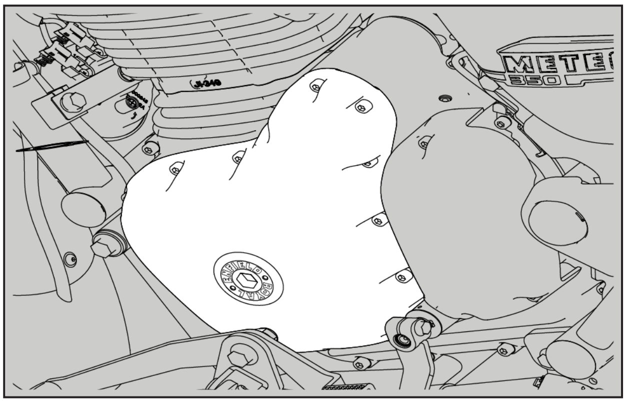
- ECU is located in the throttle body Assembly



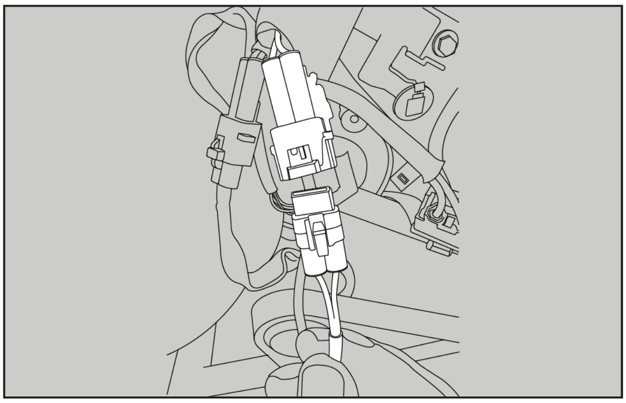
- Disconnect ECU from ECU coupler.



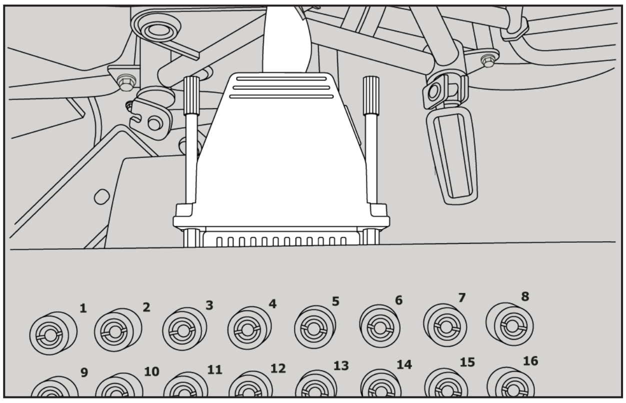
- Crank sensor is located on the Left side engine case



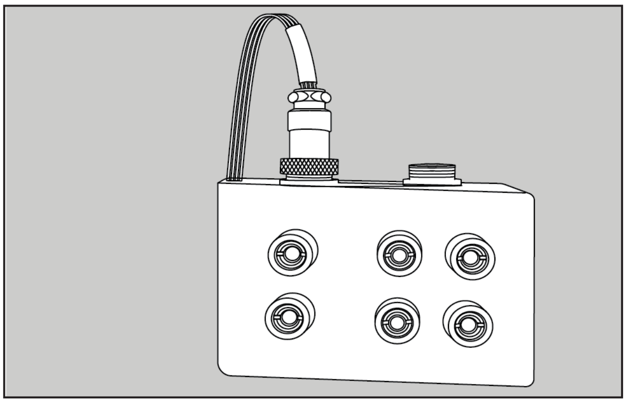
- Disconnect Crank position sensor from wiring harness coupler (black color coupler)



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness

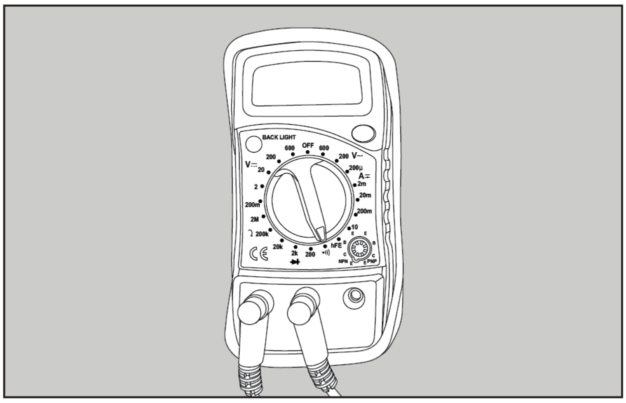


- Connect sensor Breakout Box (2P+4P Pin) to Crank position sensor breakout box harness kit

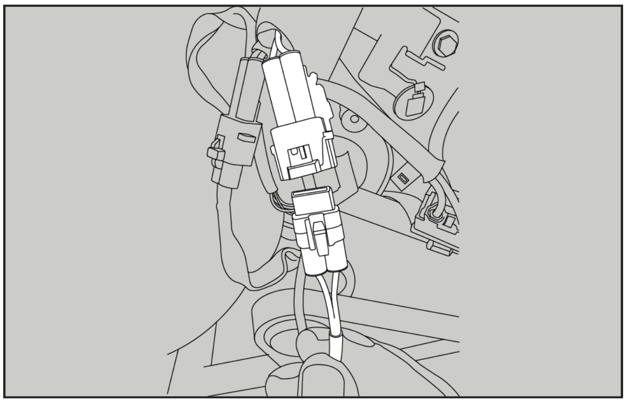


To Check Continuity of Wiring harness

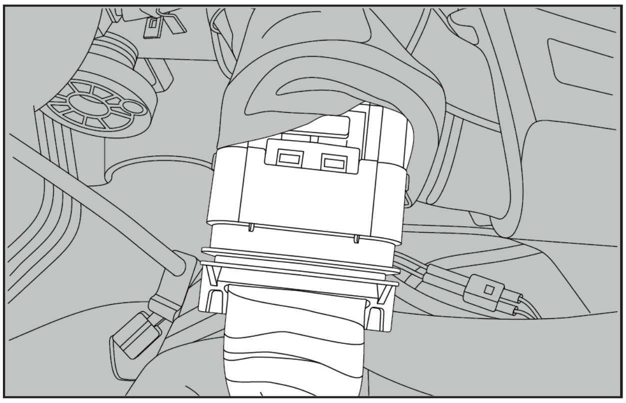
- Keep the multimeter in Continuity mode



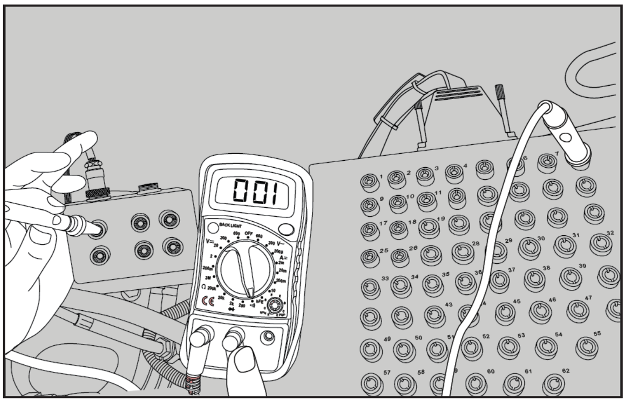
- Connect the crank position Sensor breakout box harness to Crank position sensor wiring harness coupler



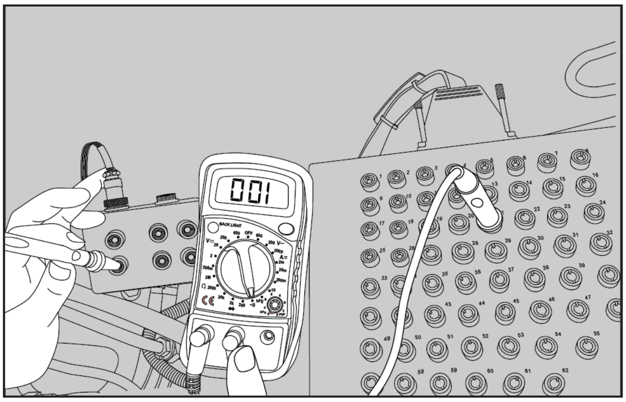
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in socket 8 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

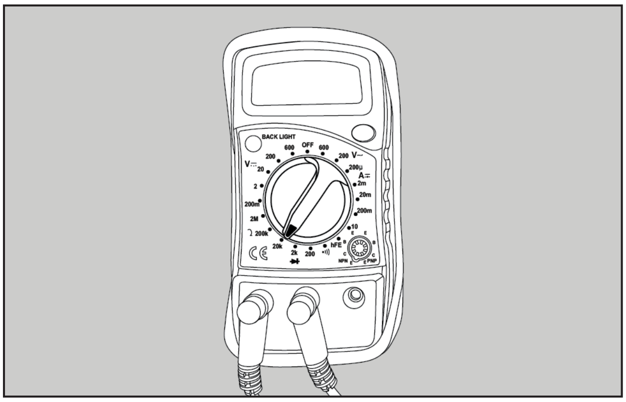


- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 21 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

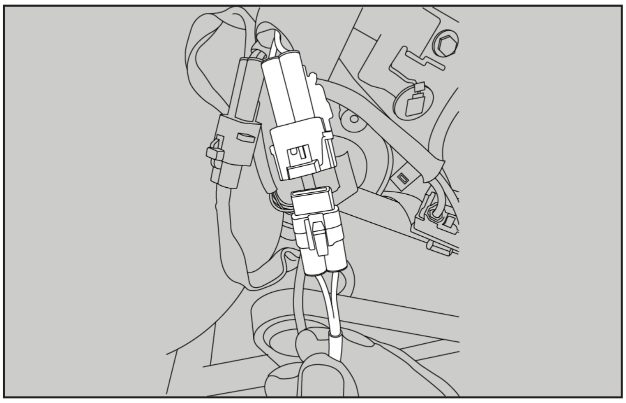


To Check the Resistance

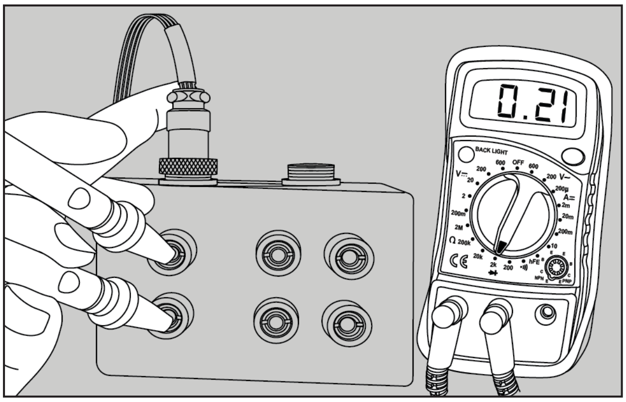
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Crank position sensor breakout box harness to the Crank position sensor coupler



- To check the Resistance value of the Crank position sensor, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box The resistance value is to be 205 to 225 Ohms @ 25+5°c



VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. DECISION POINT:

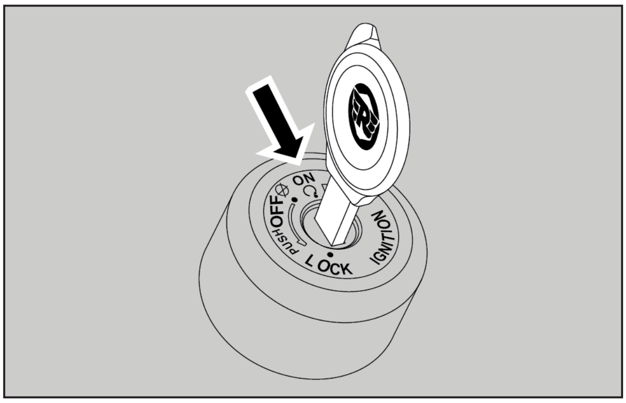
- If continuity is not available you may please replace the Wiring harness
- If the resistance is not within the specified limit (205 to225 Ohms), you replace with the Stator coil
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

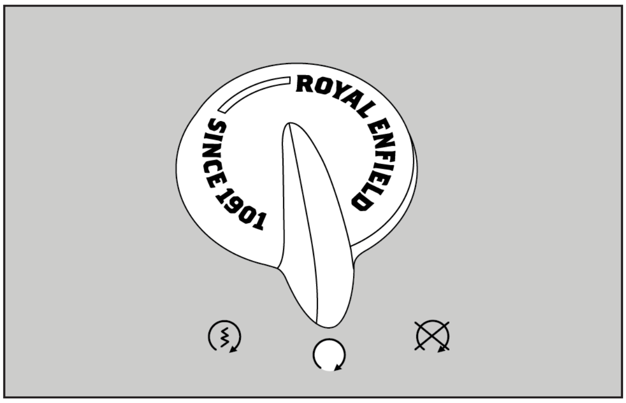
It is recommended to replace the sensor /ECU / Wiring harness as per the advice from Royal Enfield only.

DTC Clearing Procedure:

⚠ CAUTION
With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

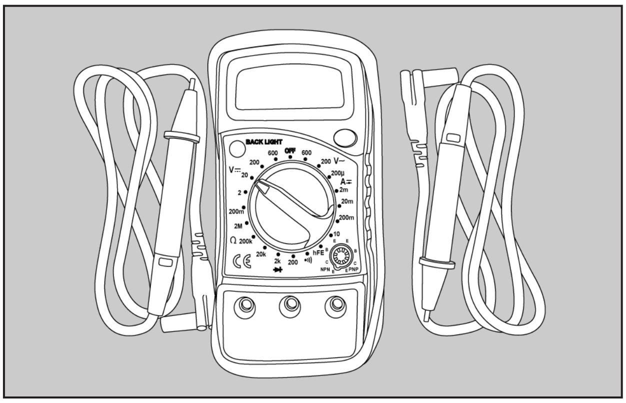
1.3. TEST LEAD WIRE METHOD:

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump-starting, etc.**

Tools Required

- Multimeter (Universal)

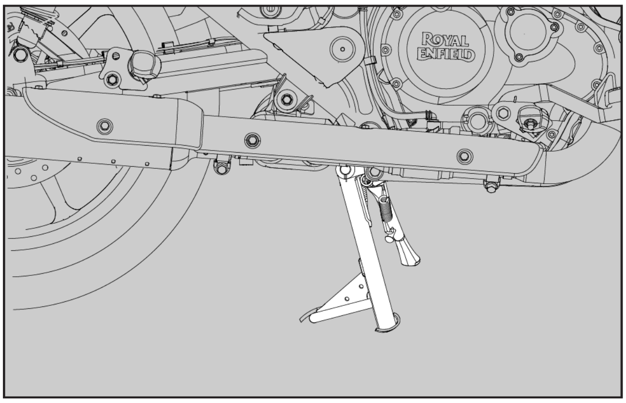


- Test lead wire (90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - Hyperlink will be given here to the chart

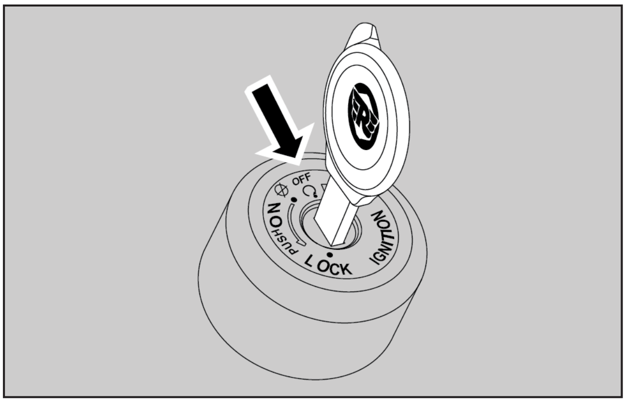
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1.Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 7.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

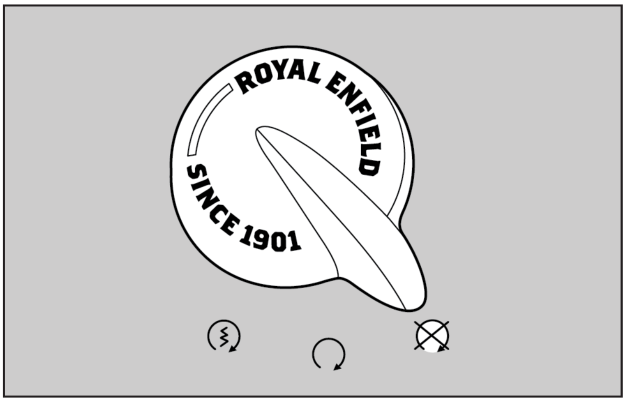
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

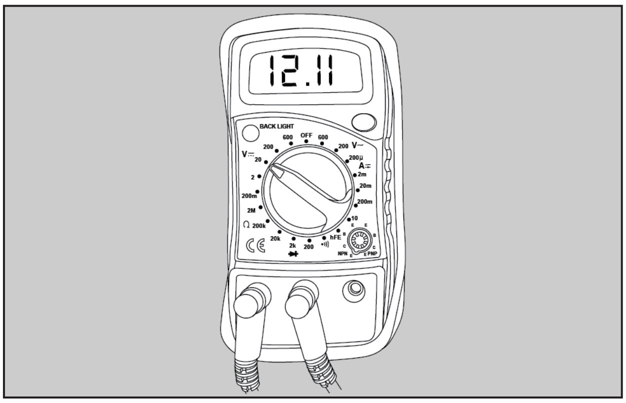


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

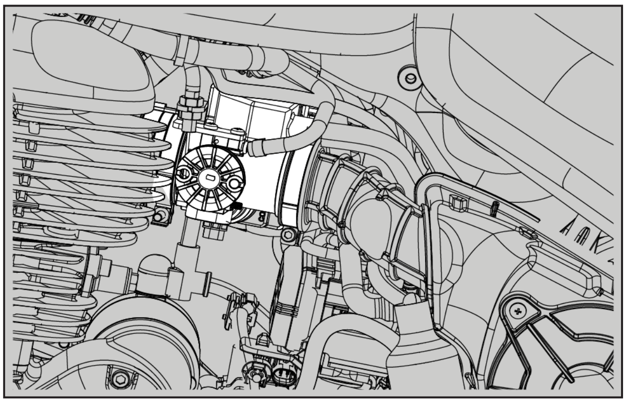
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

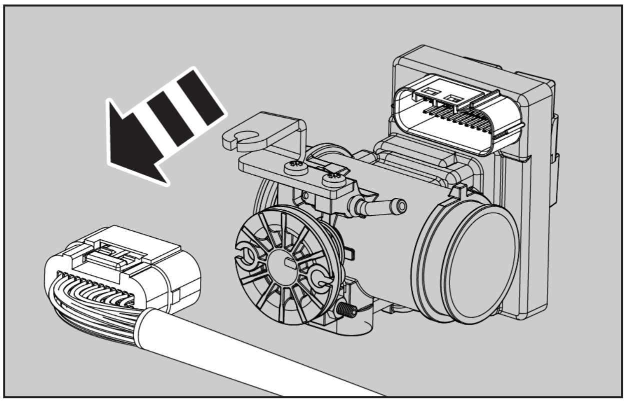
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

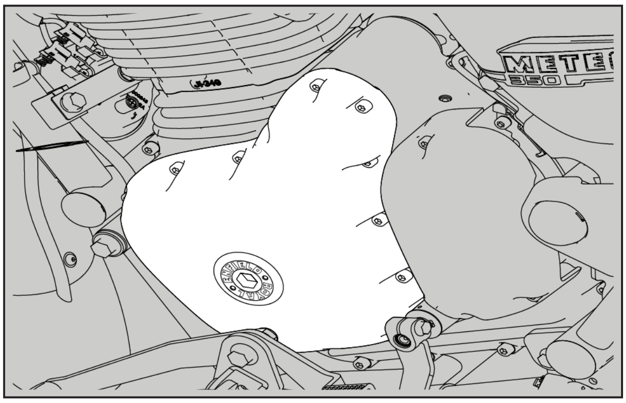
- ECU is located on the throttle body assembly



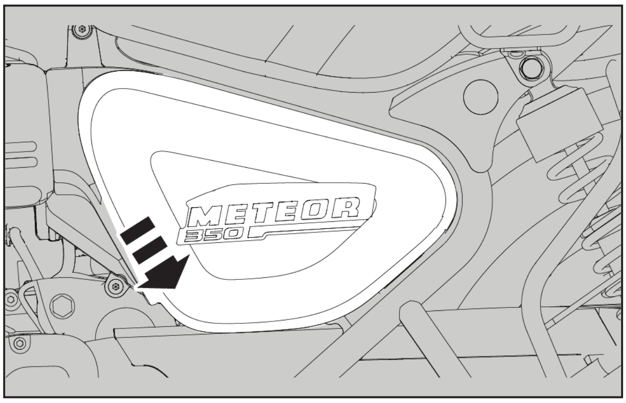
- Disconnect ECU from ECU wiring harness coupler

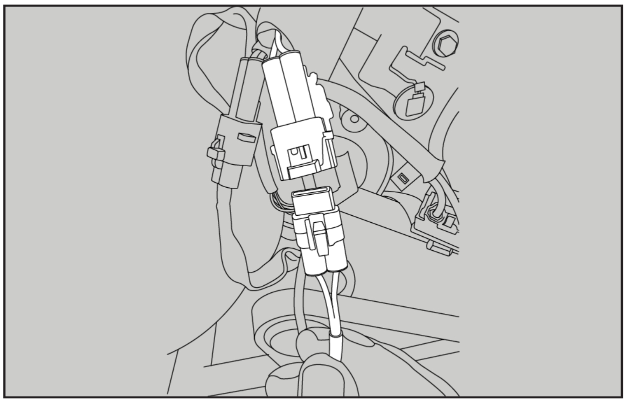


- Crank sensor coupler is located inside RH side panel bottom end



- Disconnect the Crank position sensor coupler (Black coupler).

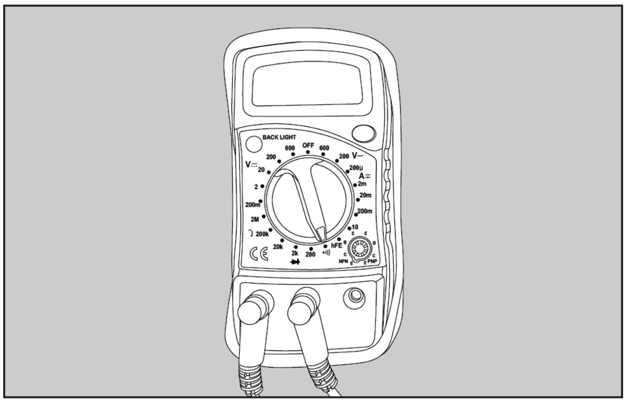




To check the Continuity of the wiring harness

STEP 1

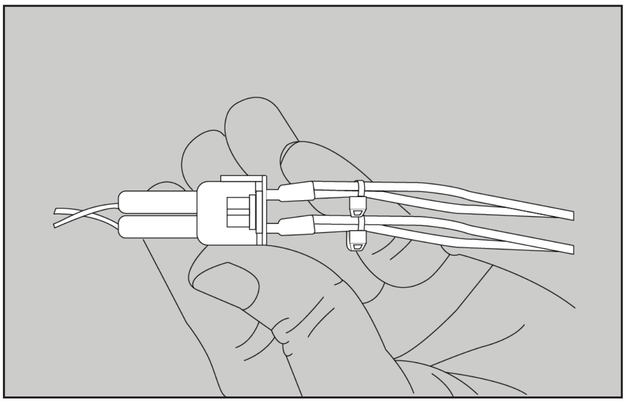
- Keep the multimeter in continuity mode.



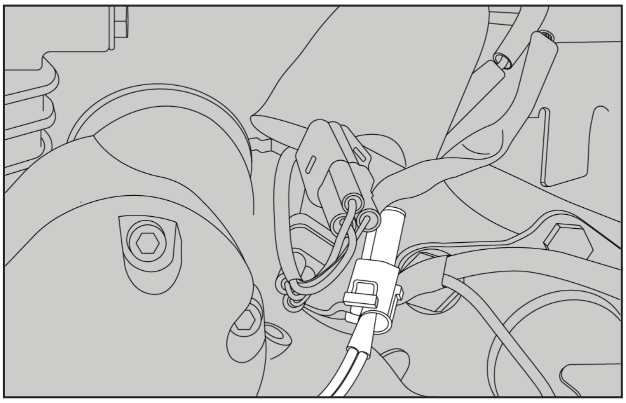
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor wiring harness coupler.

90 series (Orange Color) test lead wire with the black tag in Pin 1 of Crank position sensor wiring harness socket

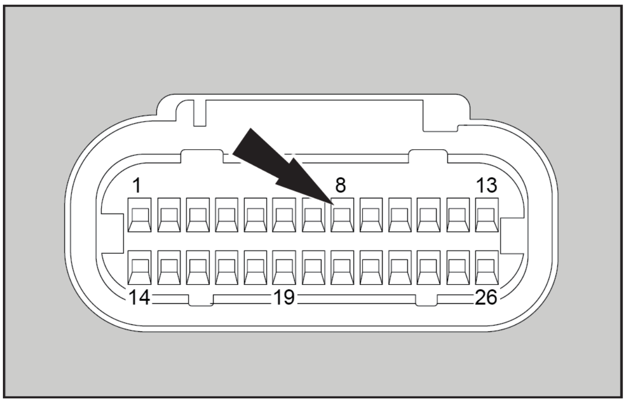
90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor wiring harness socket



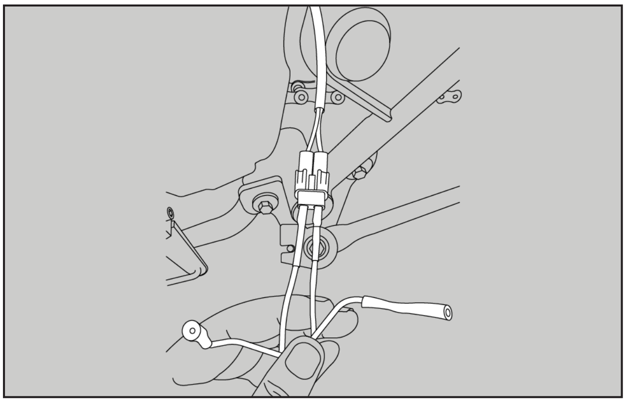
- Keep the multimeter positive probe to Pin 1 (90 series test lead wire with black tag) of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

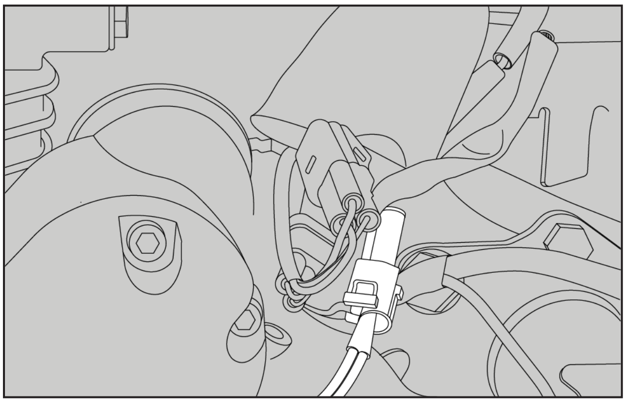


- Keep the multimeter negative probe in Pin 8 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

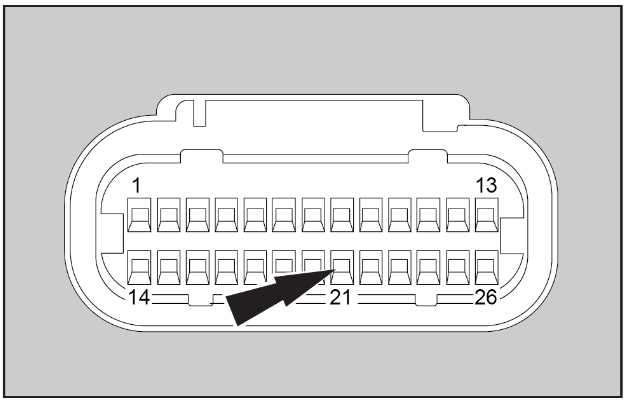


STEP 2

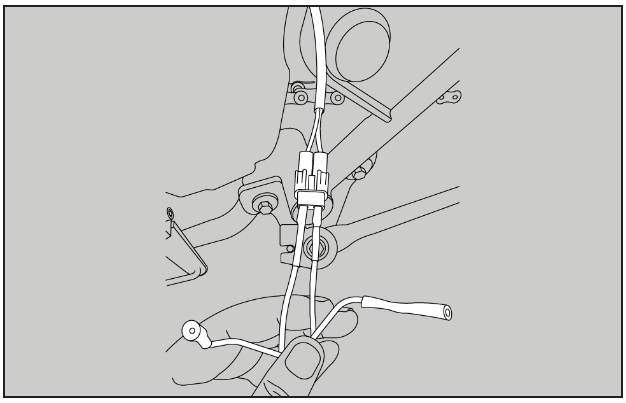
- Keep the multimeter positive probe to Pin 2 of 90 series (Orange Color) test lead wire with red tag of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 21 of the ECU wiring harness coupler



- Keep the multimeter negative probe in Pin 21 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

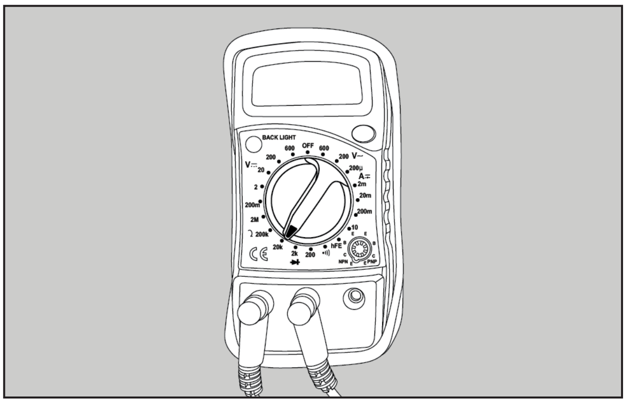


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Resistance

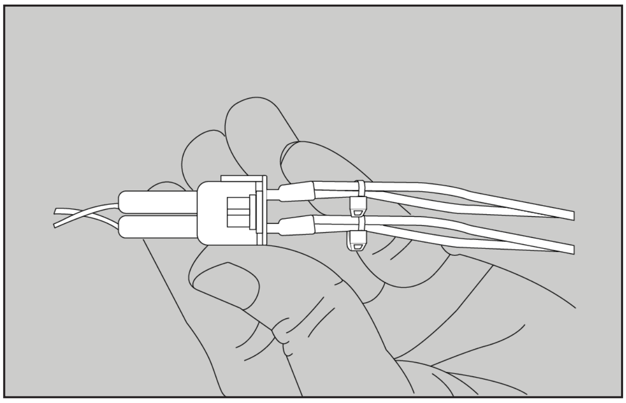
- Keep the multimeter in Resistance mode (2K ohms)



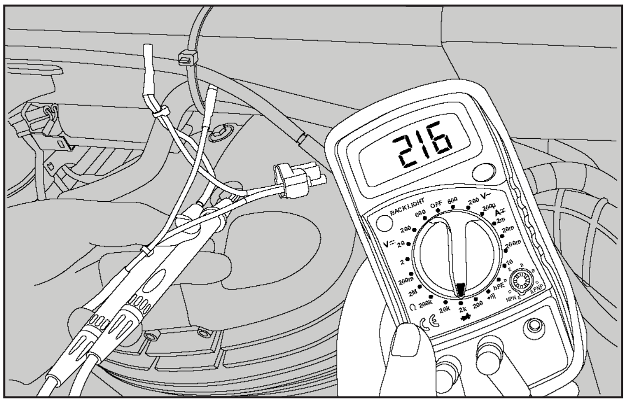
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor coupler.

90 series (orange color) test lead wire with the black tag in Pin 1 of Crank position sensor coupler

90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor coupler



- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and negative probe in Pin 2 (90 series test lead wire with red tag). Resistance value to be 205 to 225 Ohms.



⚠ CAUTION

Please ensure while disconnecting and connecting test lead wire to the couplers, ensure there is no bend or damage.

VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (205 – 225 Ohms), you replace it with the Stator coil.
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

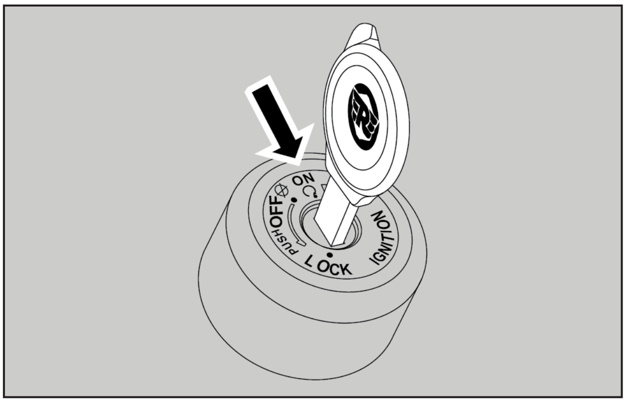
It is recommended to replace the sensor /ECU / wiring harness as per the advice from Royal Enfield only.

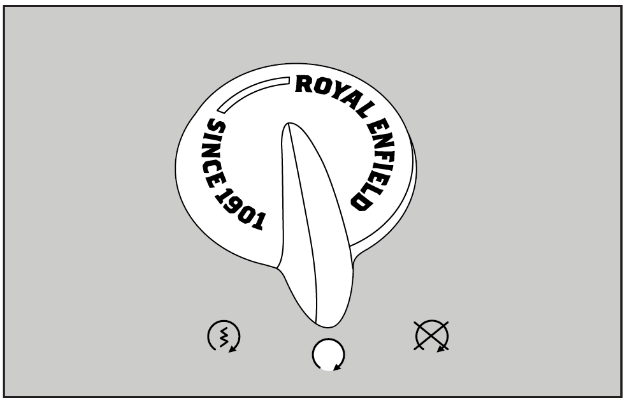
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0372- CRANK SENSOR

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0372	Crank sensor	Crank sensor missing tooth detected

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Crank sensor is also called as pulsar coil

TROUBLE CODE : DTC CODE: P0372

Type of error : Crank sensor missing tooth detected

(i) Information : Crank sensor circuit fault / Crank sensor internal fault

b.Preliminary Checks (Basic Check Points):

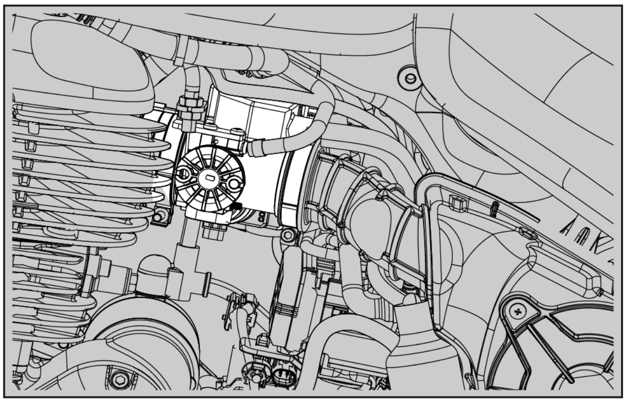
⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

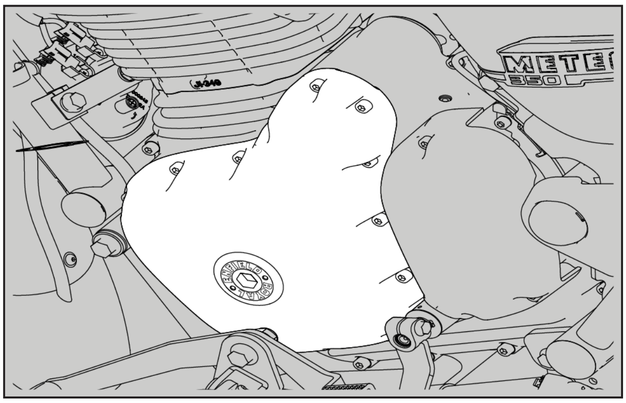
⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

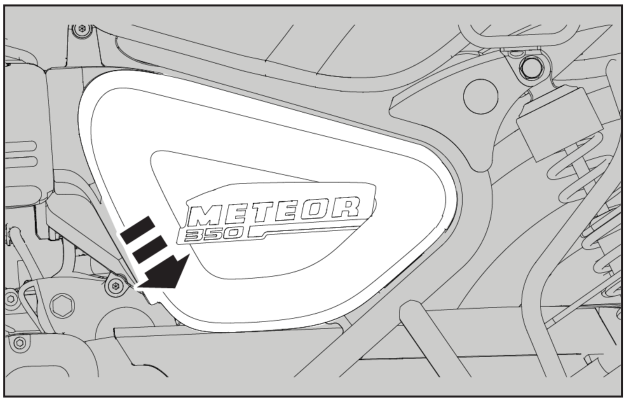
- ECU is located on the throttle body assembly



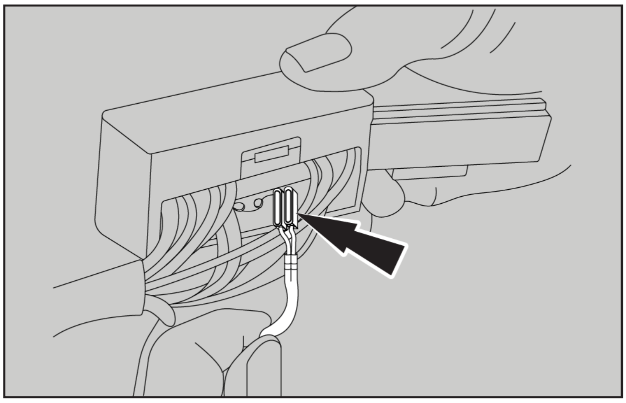
- The crank sensor is located on Left side engine crankcase



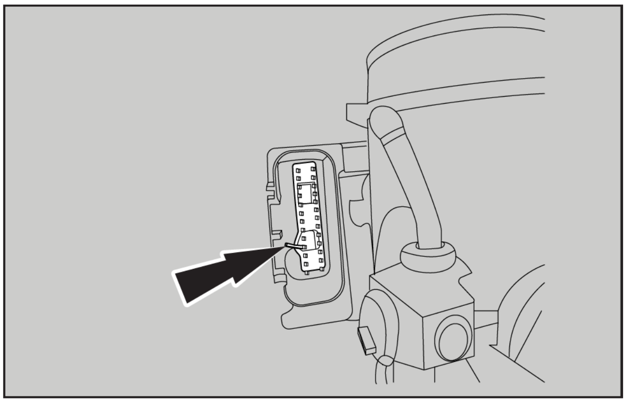
- Crank sensor coupler is located inside LH side panel bottom side



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition “ON” & “OFF”) till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

“ REFRESH DTC OPTION HAS TO APPEAR HERE”

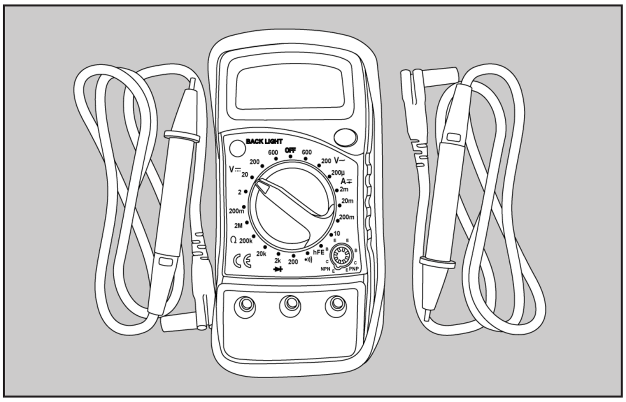
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

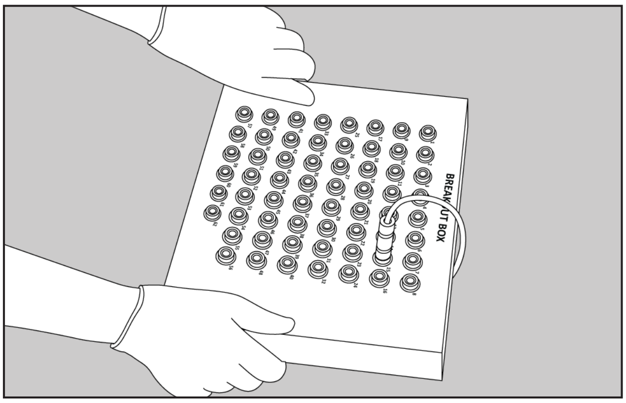
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

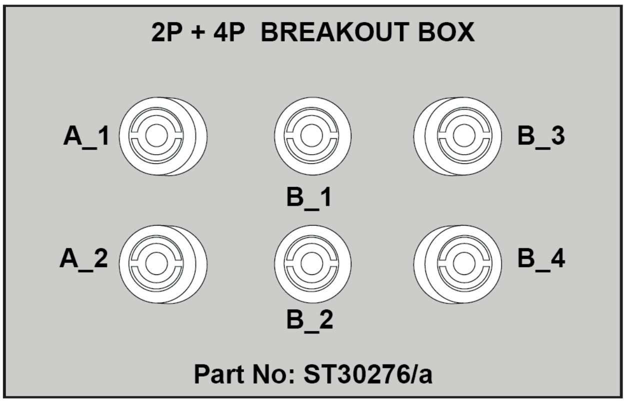
- **Tools Required**
- Multimeter (Universal)


BACK LIGHT
OFF

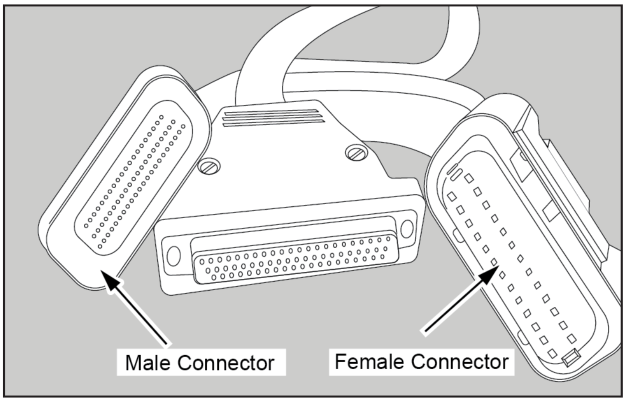
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit



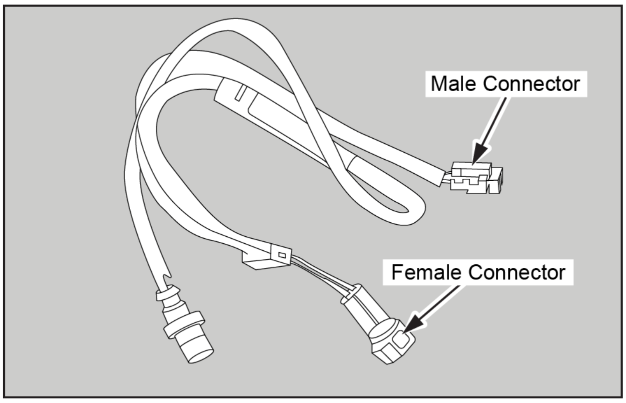
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

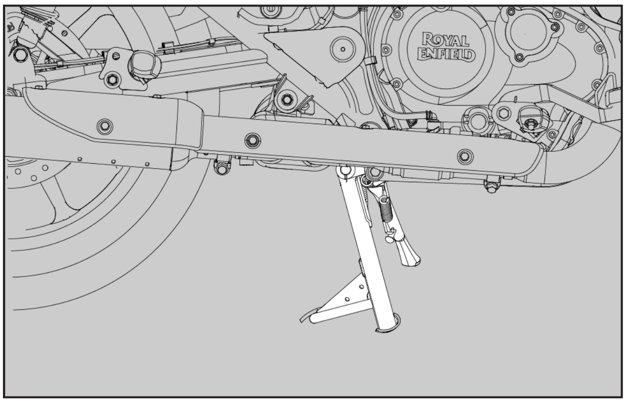

Male Connector
Female Connector

- EOT,Crank position, ignition coil -Sensor breakout box harness-2 pin ST30280/A

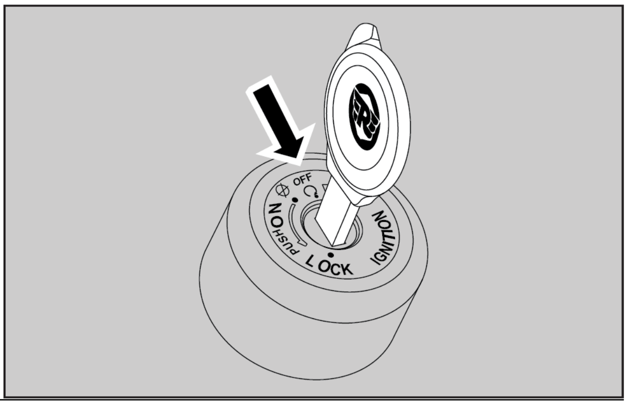

Male Connector
Female Connector

b. Pre-Checks:

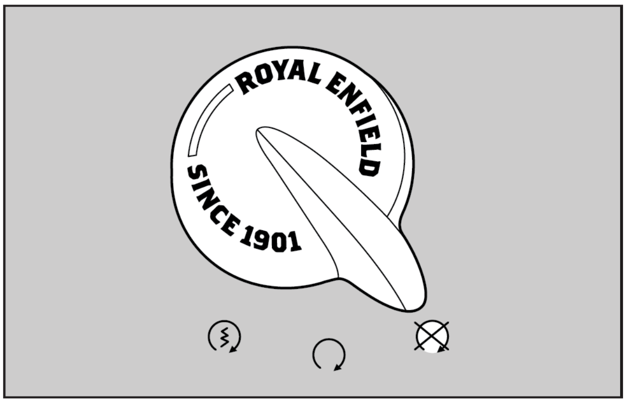
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less-Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**

⚠ CAUTION

- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU**

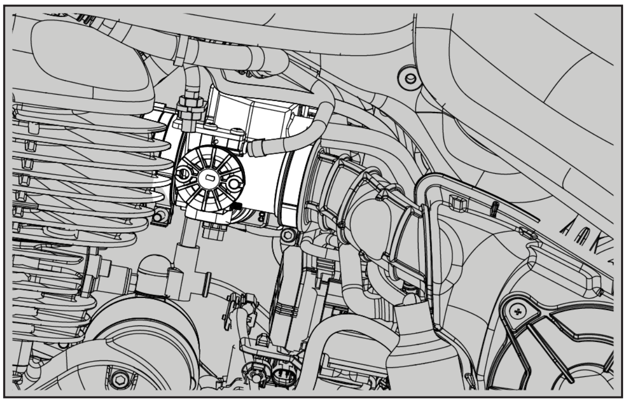
NOTE

- *Remove Left side panel to access the crank sensor coupler.*

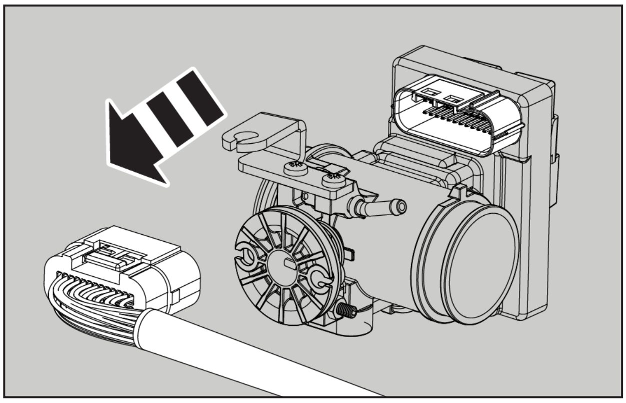
NOTE

- *Removal & refitment procedure of the left side panel is mentioned here as a hyperlink (exclusive service manual)*

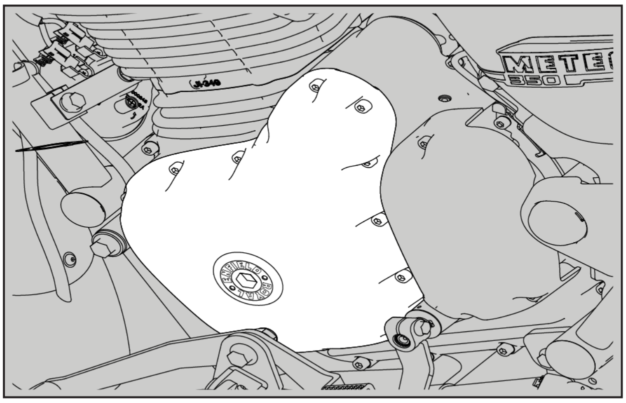
- ECU is located in the throttle body Assembly



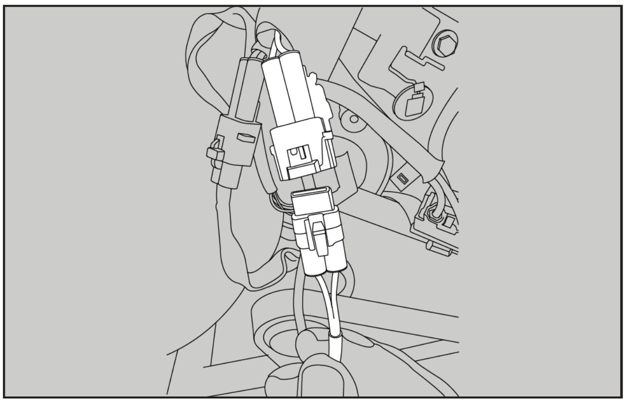
- Disconnect ECU from ECU coupler.



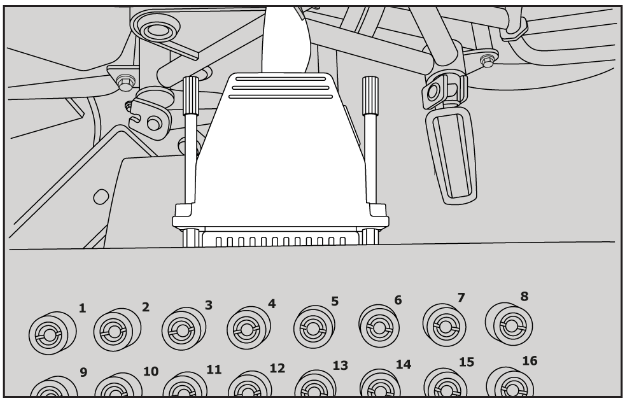
- Crank sensor is located on the Left side engine case



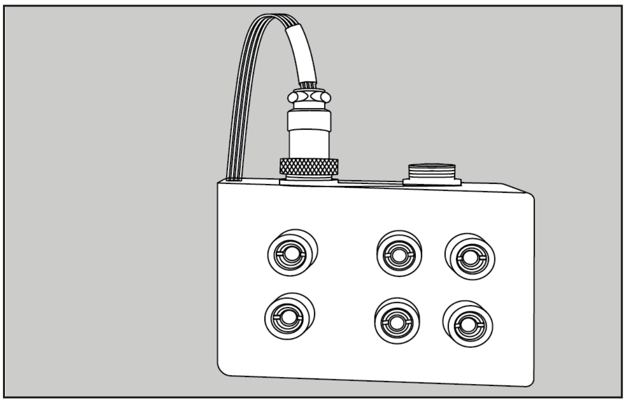
- Disconnect Crank position sensor from wiring harness coupler (black color coupler)



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness

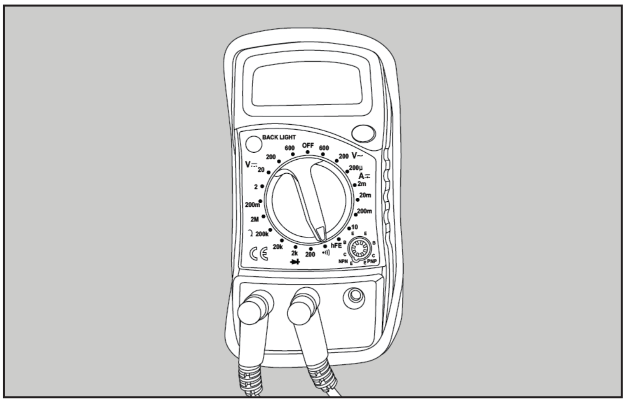


- Connect sensor Breakout Box (2P+4P Pin) to Crank position sensor breakout box harness kit

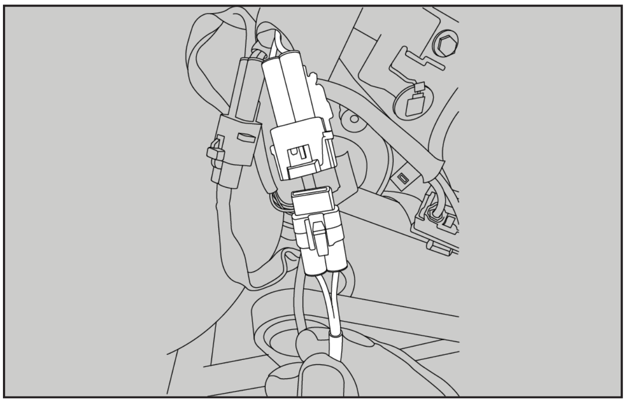


To Check Continuity of Wiring harness

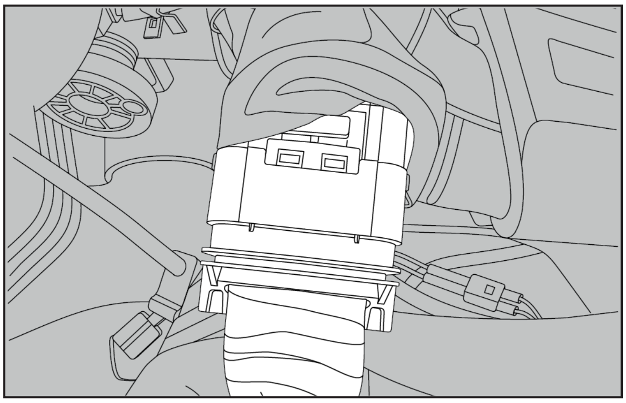
- Keep the multimeter in Continuity mode



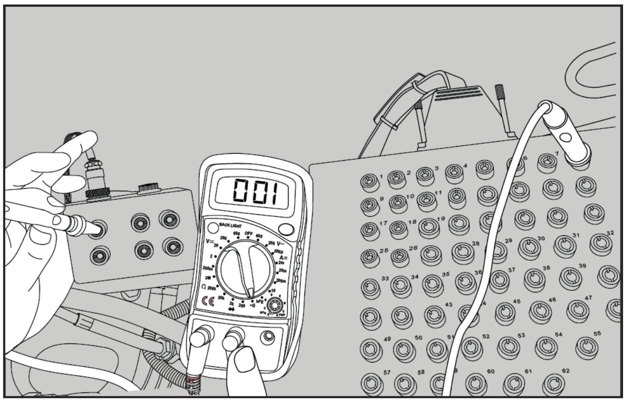
- Connect the crank position Sensor breakout box harness to Crank position sensor wiring harness coupler



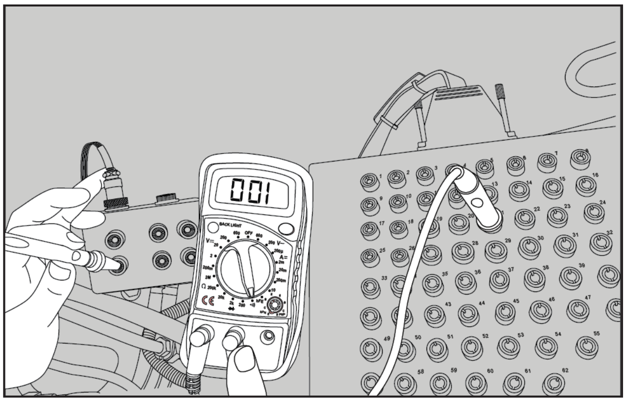
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in socket 8 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

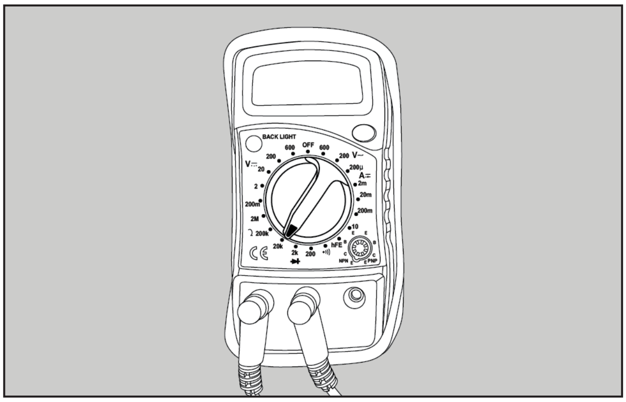


- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 21 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

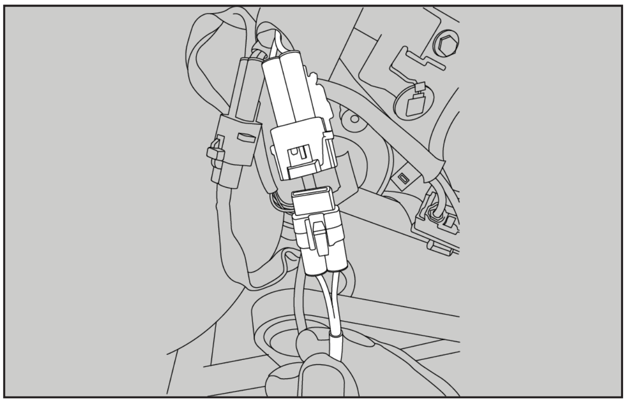


To Check the Resistance

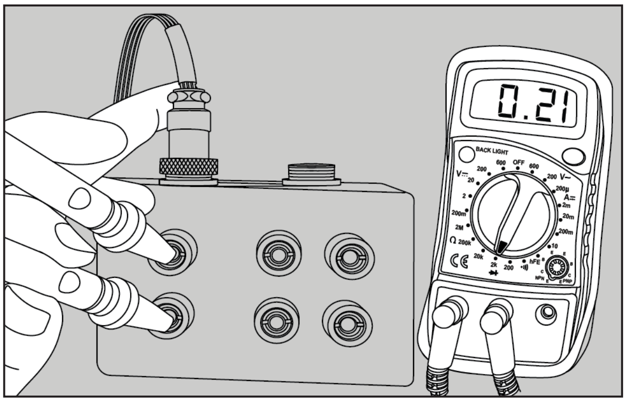
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Crank position sensor breakout box harness to the Crank position sensor coupler



- To check the Resistance value of the Crank position sensor, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box The resistance value is to be 205 to 225 Ohms @ 25+5°c



VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness
- If the resistance is not within the specified limit (205 to225 Ohms), you replace with the Stator coil
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

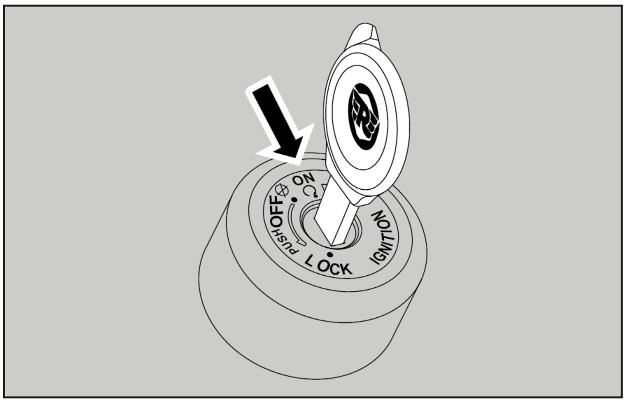
It is recommended to replace the sensor /ECU / Wiring harness as per the advice from Royal Enfield only.

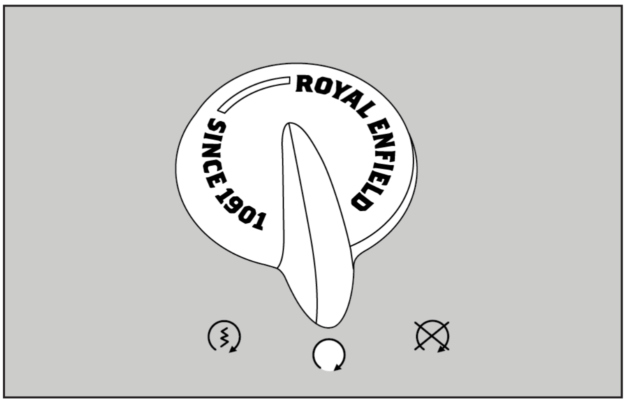
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

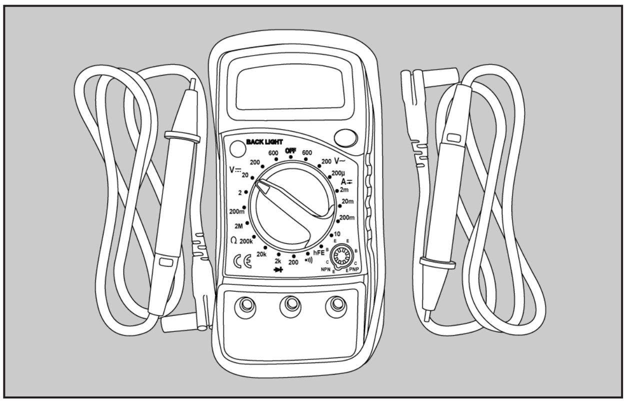
1.3. TEST LEAD WIRE METHOD:

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump-starting, etc.**

Tools Required

- Multimeter (Universal)

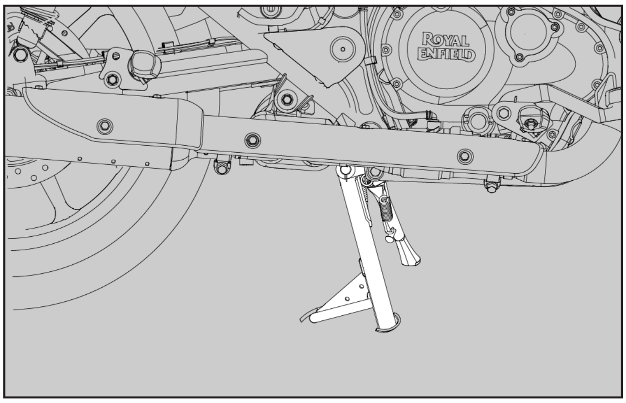


- Test lead wire (90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - Hyperlink will be given here to the chart

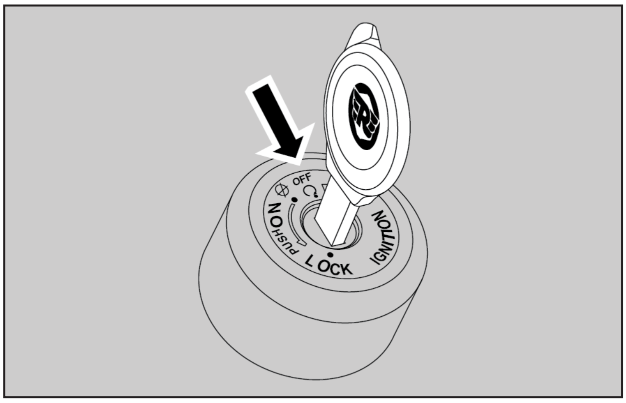
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1.Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 7.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

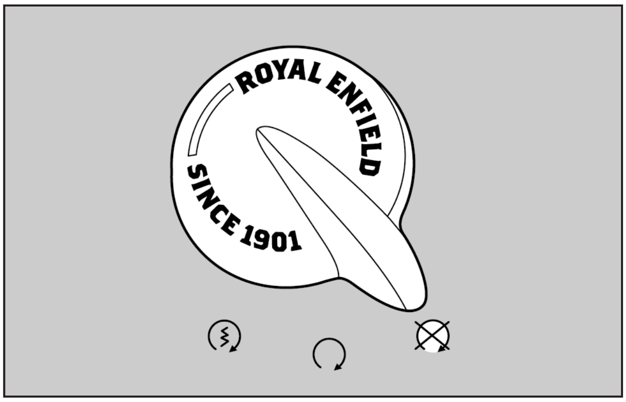
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

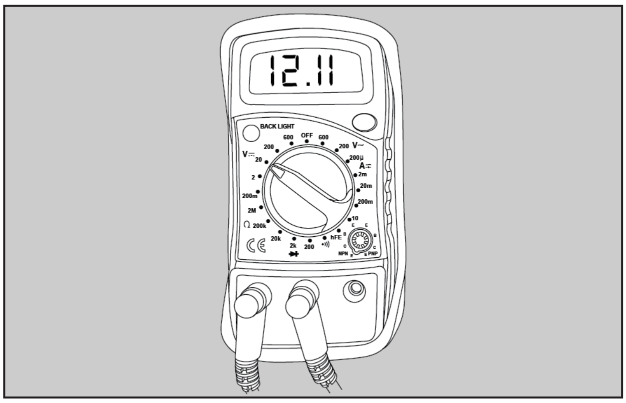


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

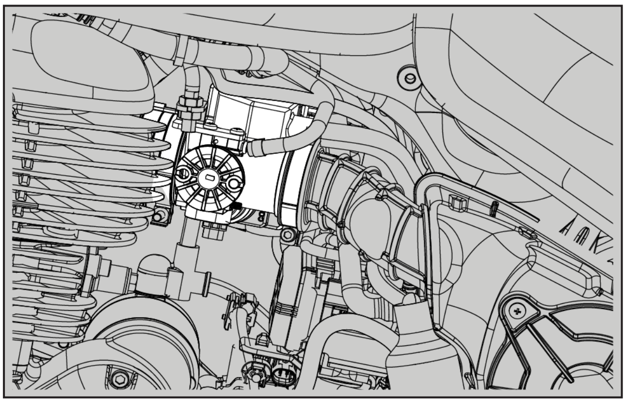
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

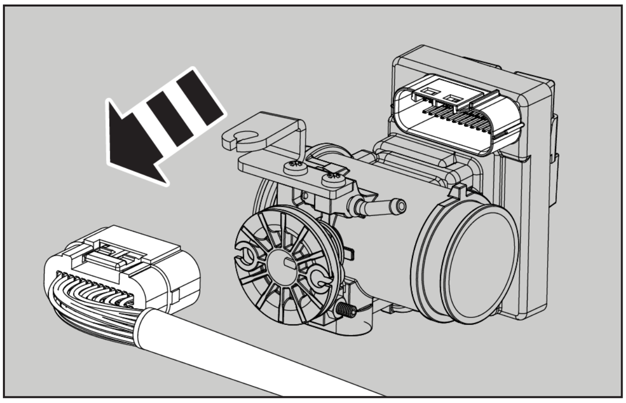
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

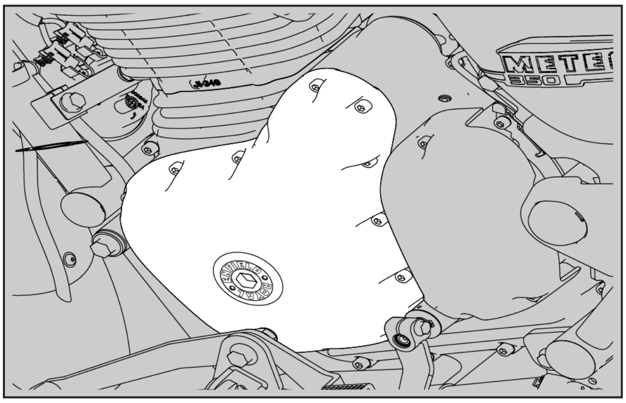
- ECU is located on the throttle body assembly



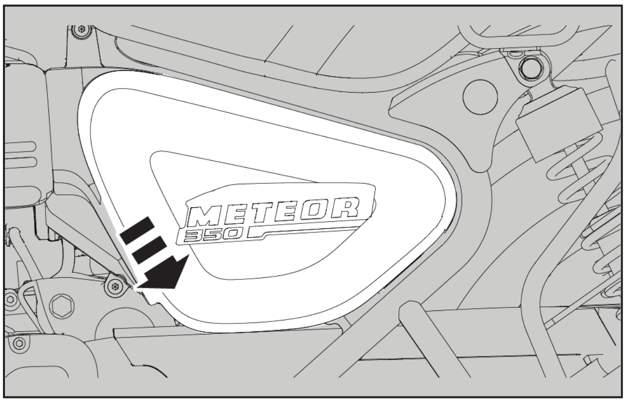
- Disconnect ECU from ECU wiring harness coupler

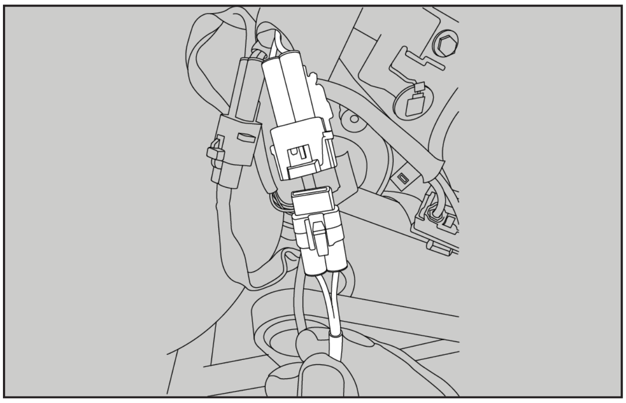


- Crank sensor coupler is located inside RH side panel bottom end



- Disconnect the Crank position sensor coupler (Black coupler).

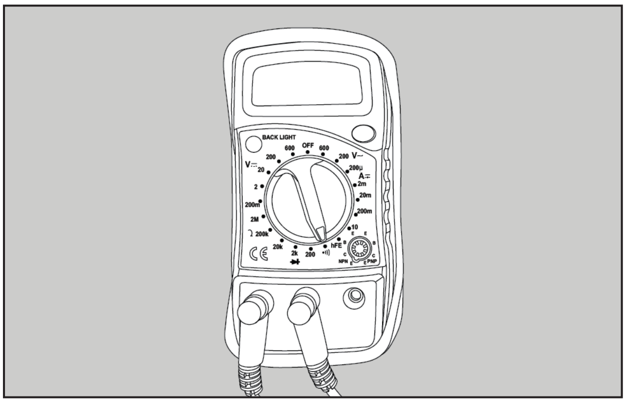




To check the Continuity of the wiring harness

STEP 1

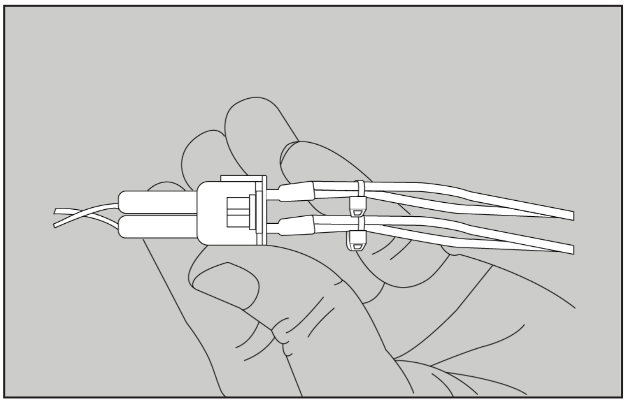
- Keep the multimeter in continuity mode.



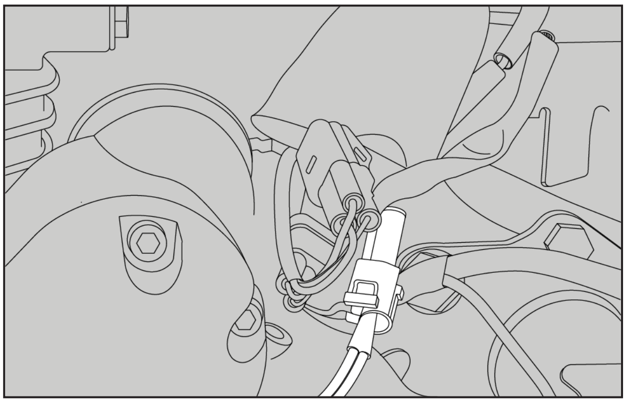
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor wiring harness coupler.

90 series (Orange Color) test lead wire with the black tag in Pin 1 of Crank position sensor wiring harness socket

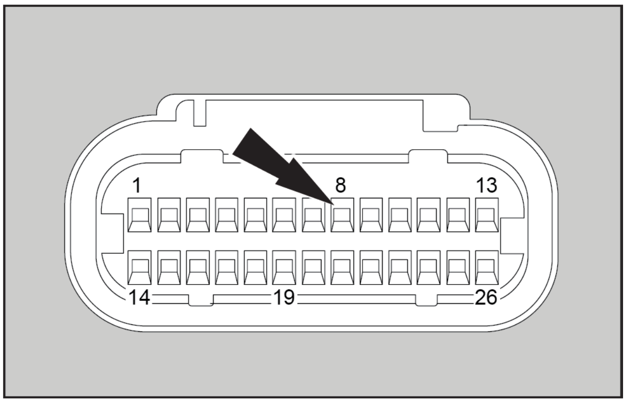
90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor wiring harness socket



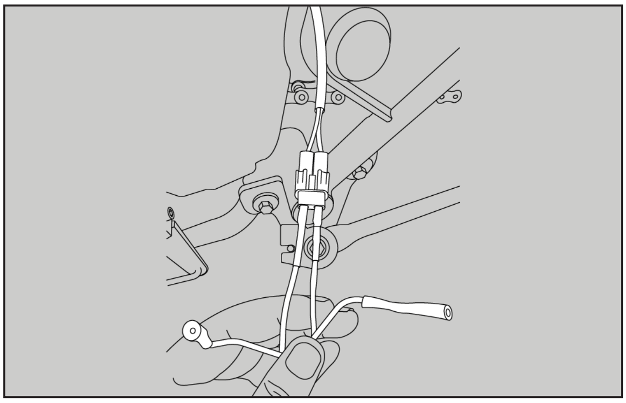
- Keep the multimeter positive probe to Pin 1 (90 series test lead wire with black tag) of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

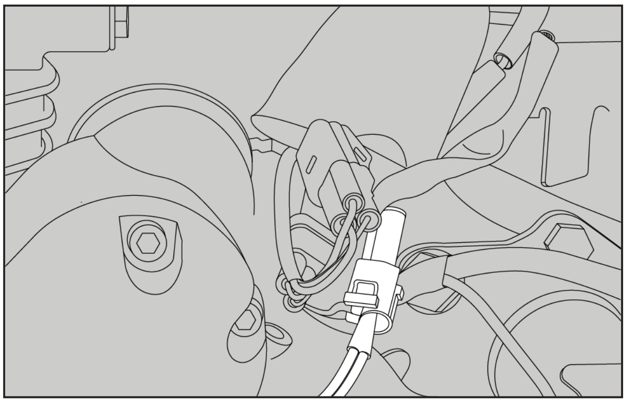


- Keep the multimeter negative probe in Pin 8 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

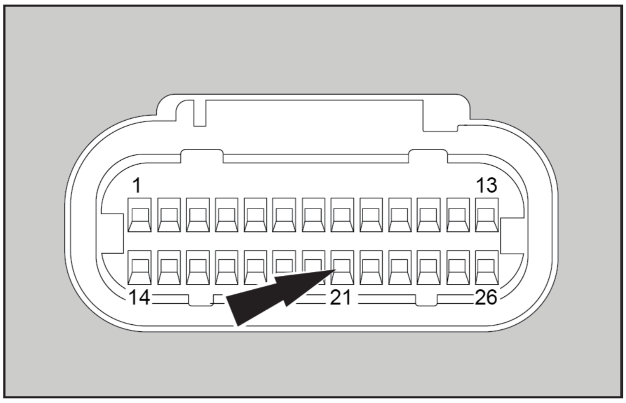


STEP 2

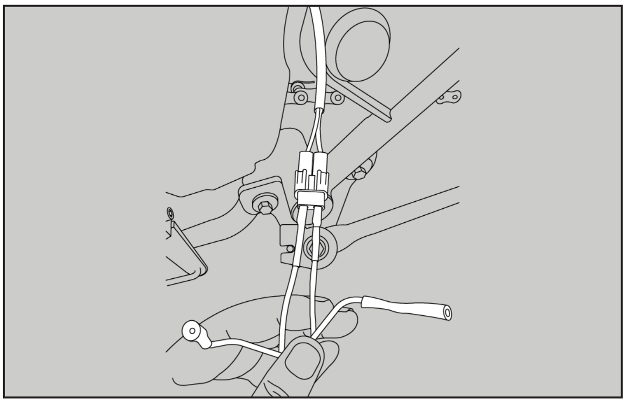
- Keep the multimeter positive probe to Pin 2 of 90 series (Orange Color) test lead wire with red tag of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 21 of the ECU wiring harness coupler



- Keep the multimeter negative probe in Pin 21 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

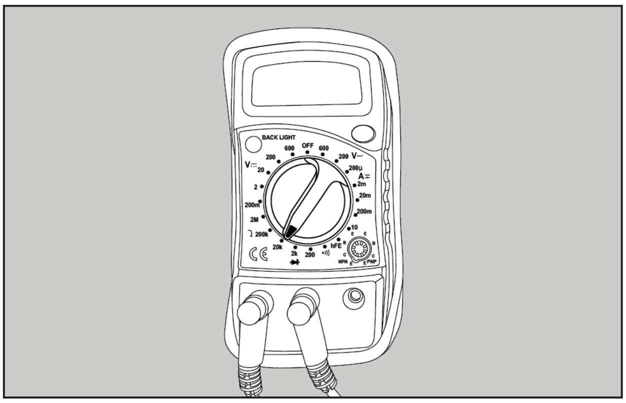


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Resistance

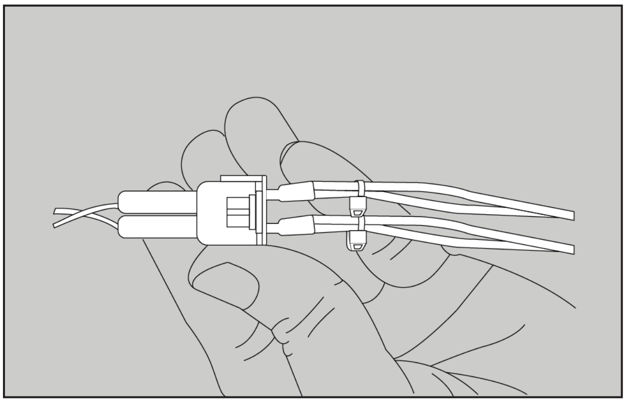
- Keep the multimeter in Resistance mode (2K ohms)



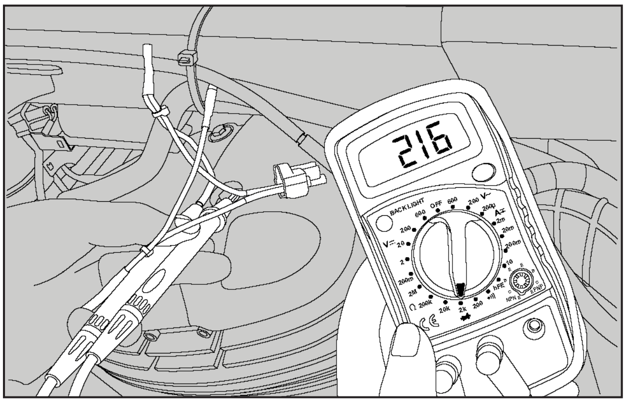
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor coupler.

90 series (orange color) test lead wire with the black tag in Pin 1 of Crank position sensor coupler

90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor coupler



- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and negative probe in Pin 2 (90 series test lead wire with red tag). Resistance value to be 205 to 225 Ohms.



⚠ CAUTION

Please ensure while disconnecting and connecting test lead wire to the couplers, ensure there is no bend or damage.

VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (205 – 225 Ohms), you replace it with the Stator coil.
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

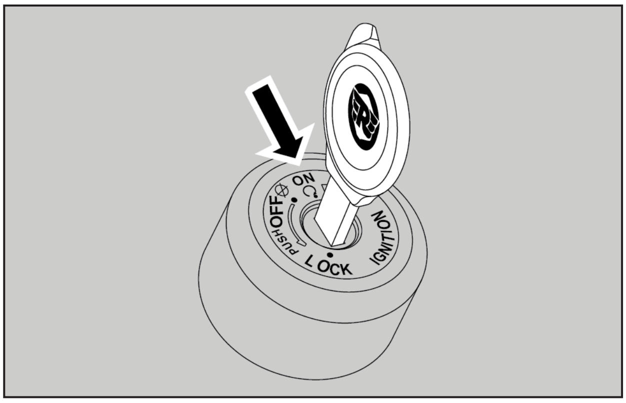
It is recommended to replace the sensor /ECU / wiring harness as per the advice from Royal Enfield only.

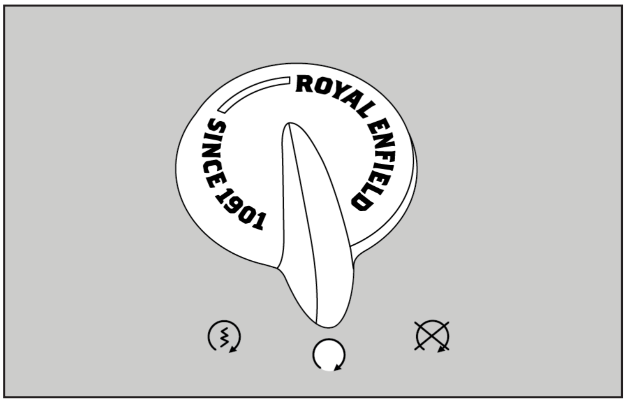
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0373- CRANK SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0373	Crank sensor	Crank sensor Additional edges inside filtering period

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Crank sensor is also called as pulsar coil

TROUBLE CODE : DTC CODE: P0373

Type of error : Crank sensor Additional edges inside filtering period

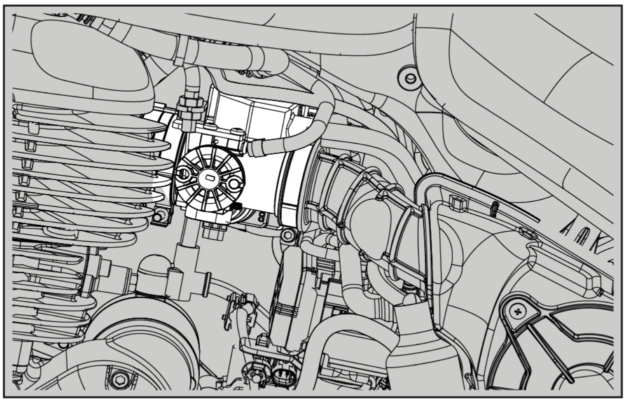
(i) Information :Crank sensor circuit fault / Crank sensor internal fault (Suggested Simple Description)

b.Preliminary Checks (Basic Check Points):

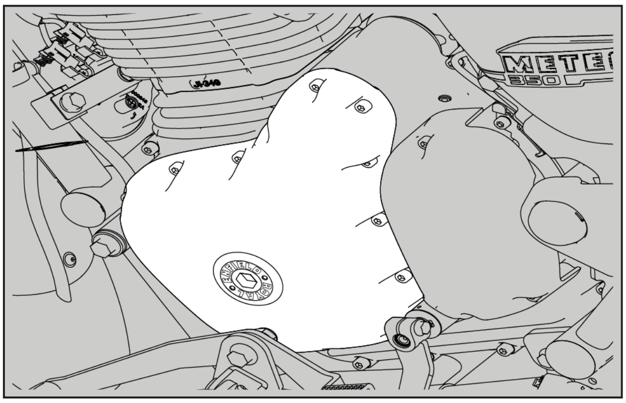
⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

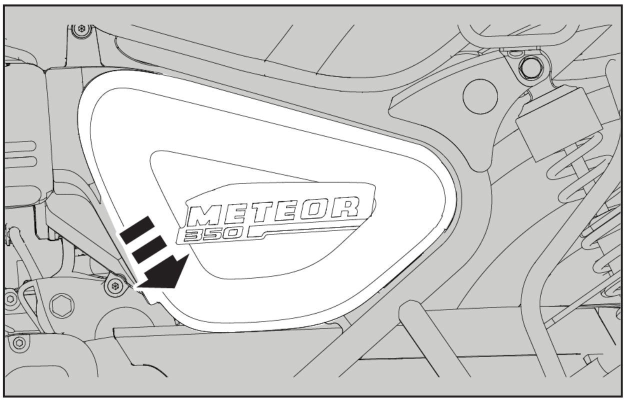
- ECU is located on the throttle body assembly



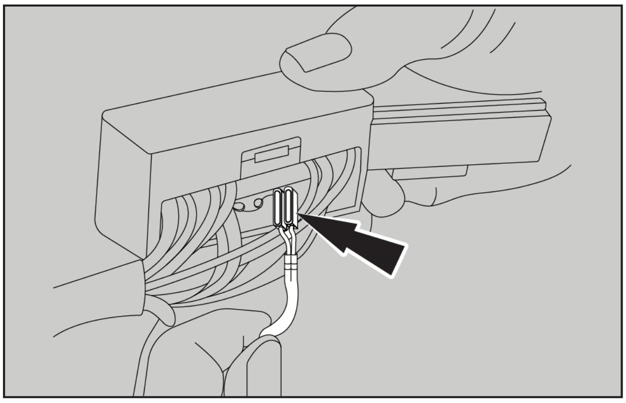
- The crank sensor is located on Left side engine crankcase



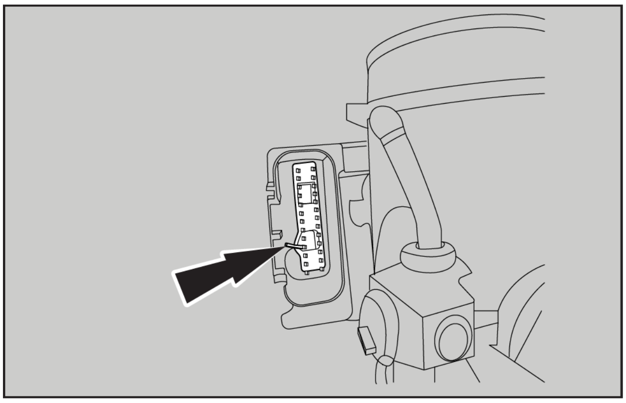
- Crank sensor coupler is located inside LH side panel bottom side



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition “ON” & “OFF”) till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

“ REFRESH DTC OPTION HAS TO APPEAR HERE”

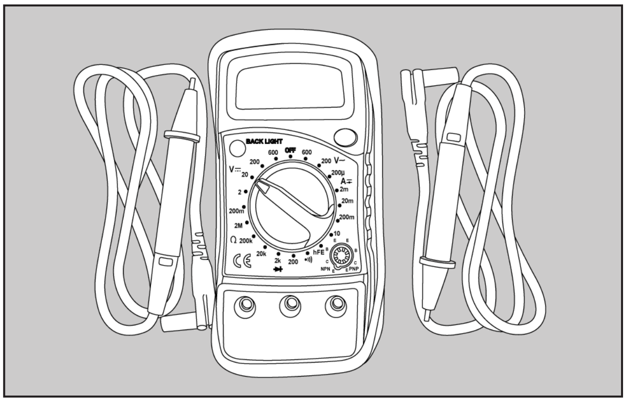
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

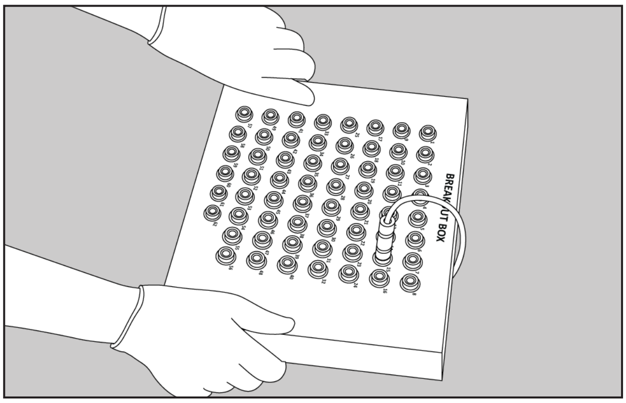
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

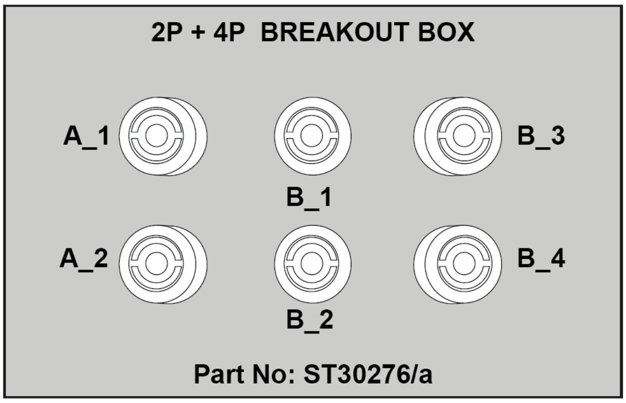
- **Tools Required**
- Multimeter (Universal)


BACK LIGHT
OFF

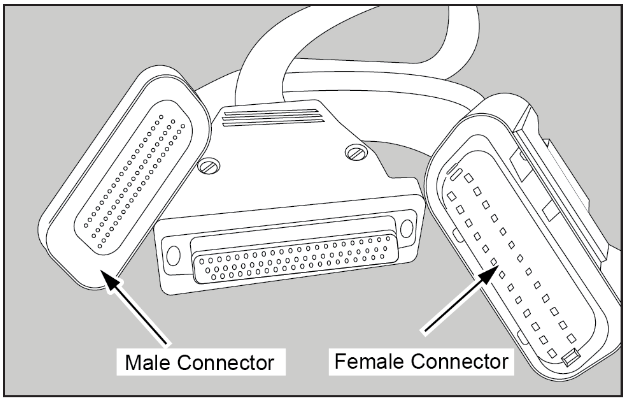
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

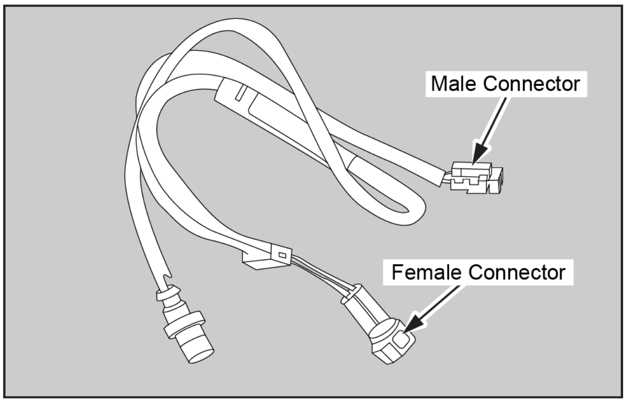
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

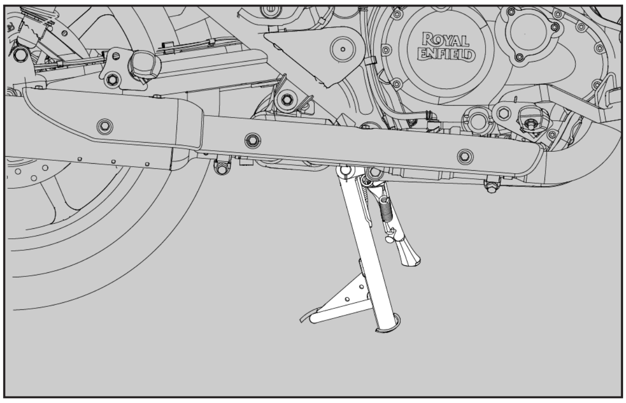

Male Connector
Female Connector

- EOT,Crank position, ignition coil -Sensor breakout box harness-2 pin ST30280/A

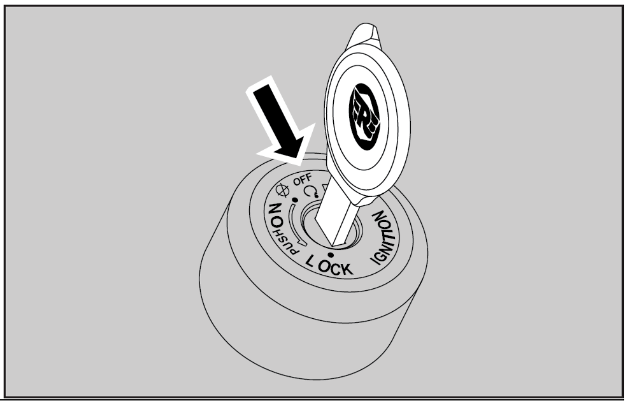

Male Connector
Female Connector

b. Pre-Checks:

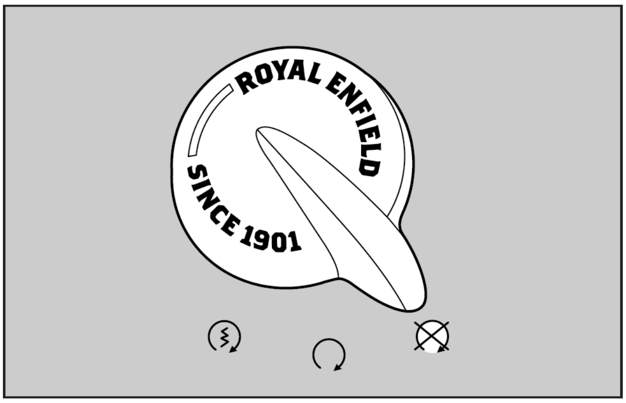
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less-Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**

⚠ CAUTION

- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU**

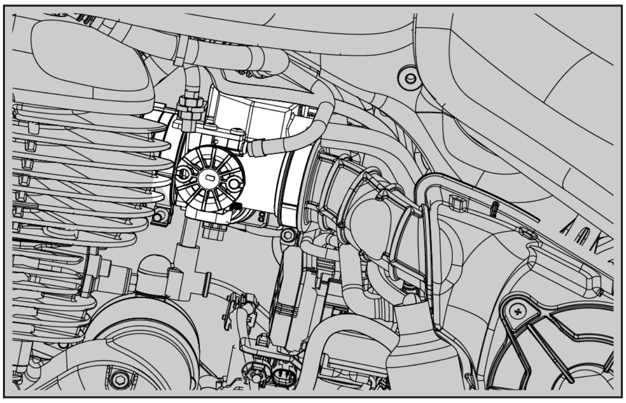
NOTE

- *Remove Left side panel to access the crank sensor coupler.*

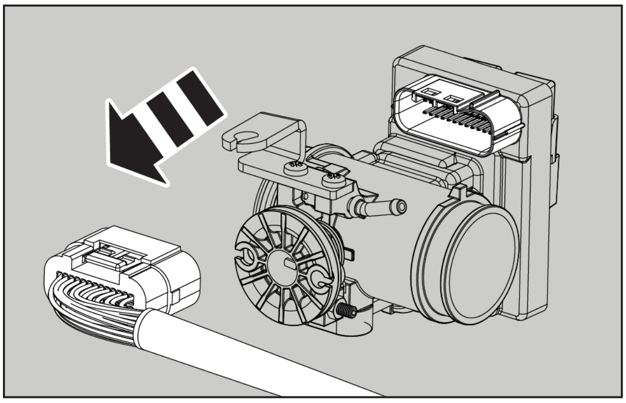
NOTE

- *Removal & refitment procedure of the left side panel is mentioned here as a hyperlink (exclusive service manual)*

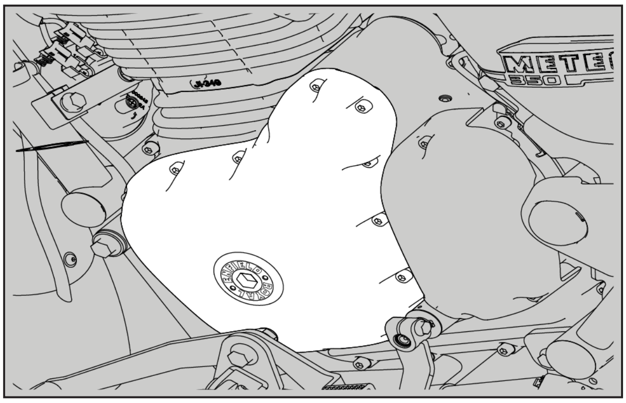
- ECU is located in the throttle body Assembly



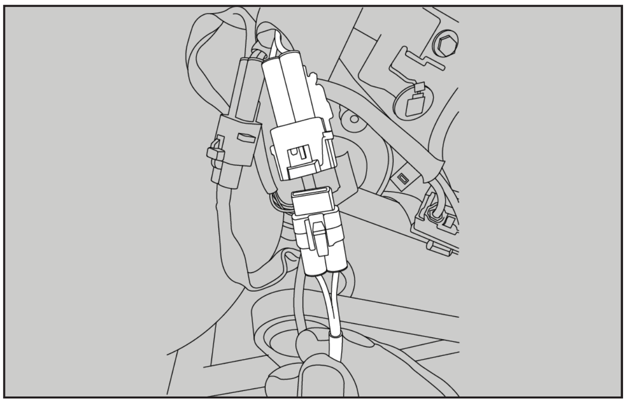
- Disconnect ECU from ECU coupler.



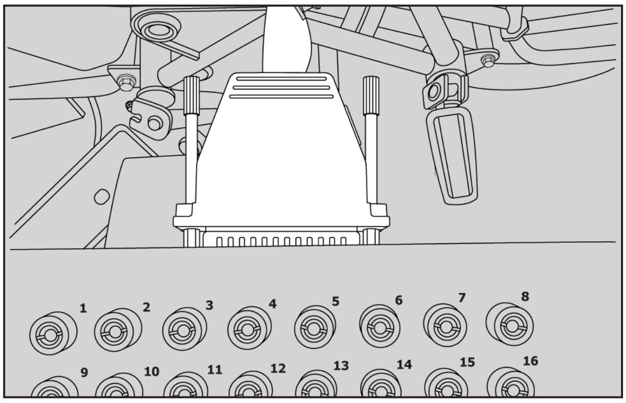
- Crank sensor is located on the Left side engine case



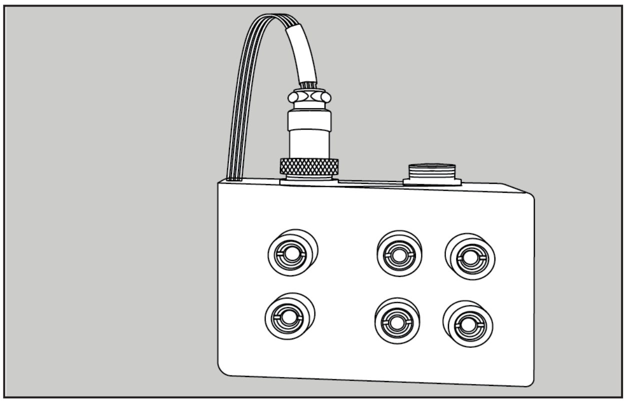
- Disconnect Crank position sensor from wiring harness coupler (black color coupler)



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness

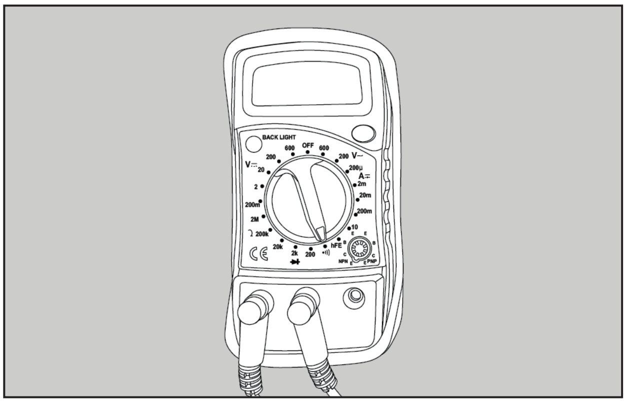

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

- Connect sensor Breakout Box (2P+4P Pin) to Crank position sensor breakout box harness kit

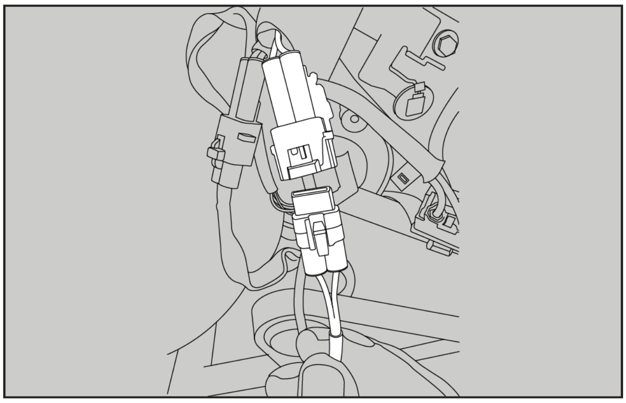


To Check Continuity of Wiring harness

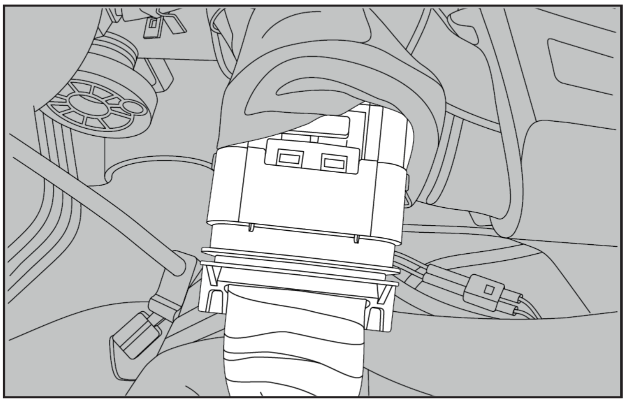
- Keep the multimeter in Continuity mode


BACK LIGHT
OFF
600
600
200
200
V⎓
V~
A⎓
hFE

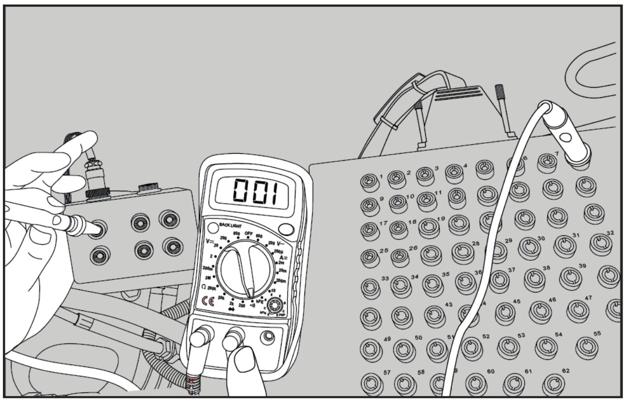
- Connect the crank position Sensor breakout box harness to Crank position sensor wiring harness coupler



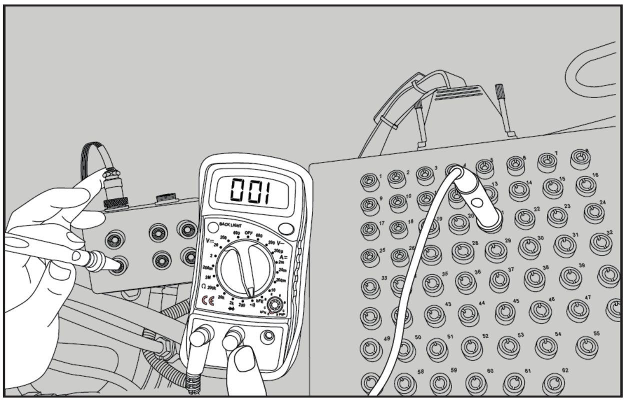
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in socket 8 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

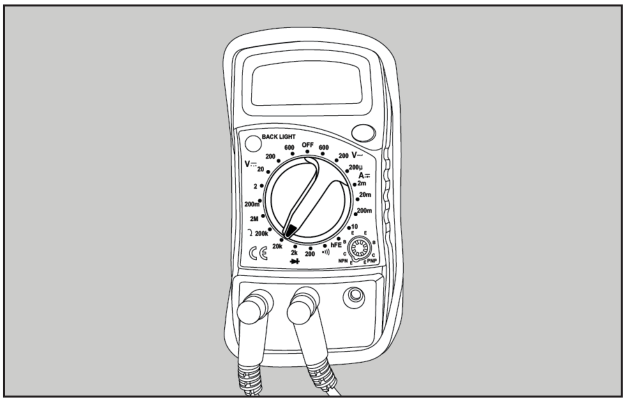


- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 21 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

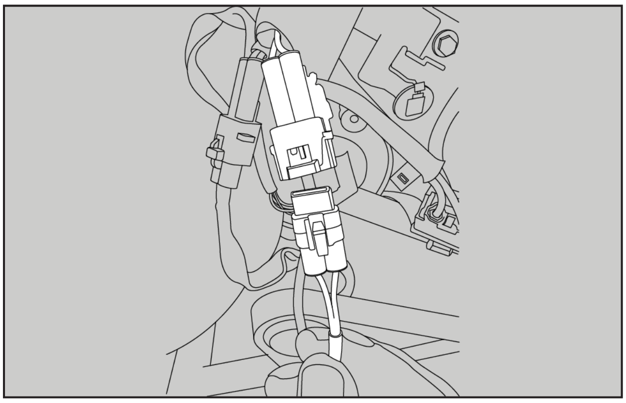


To Check the Resistance

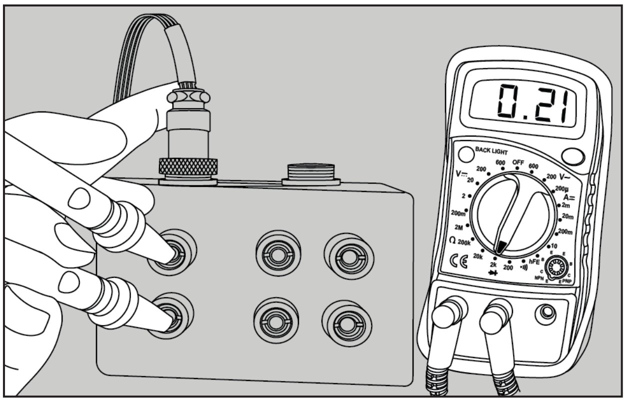
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Crank position sensor breakout box harness to the Crank position sensor coupler



- To check the Resistance value of the Crank position sensor, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box The resistance value is to be 205 to 225 Ohms @ 25+5°c



VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness
- If the resistance is not within the specified limit (205 to225 Ohms), you replace with the Stator coil
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

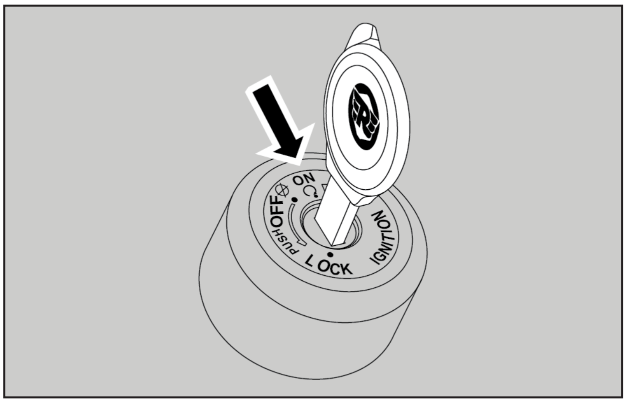
It is recommended to replace the sensor /ECU / Wiring harness as per the advice from Royal Enfield only.

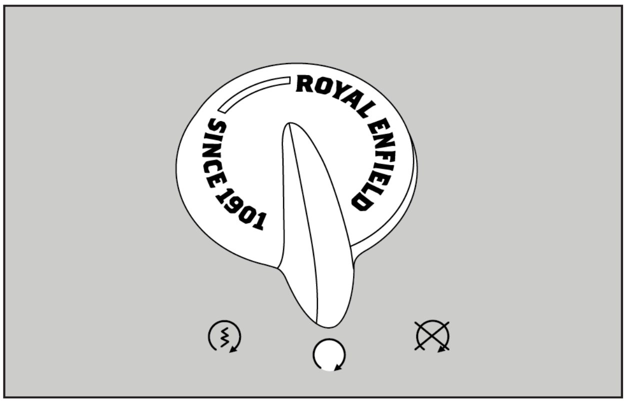
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

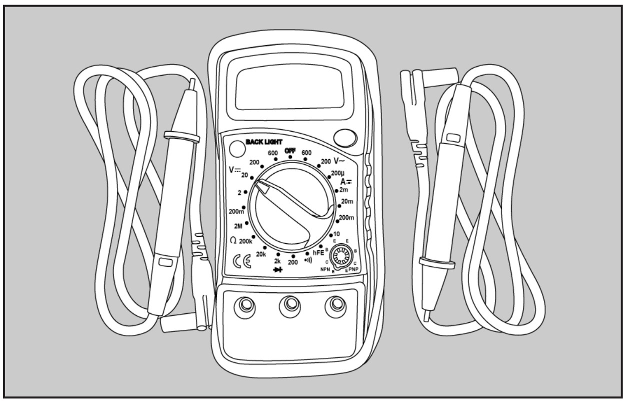
1.3. TEST LEAD WIRE METHOD:

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump-starting, etc.**

Tools Required

- Multimeter (Universal)

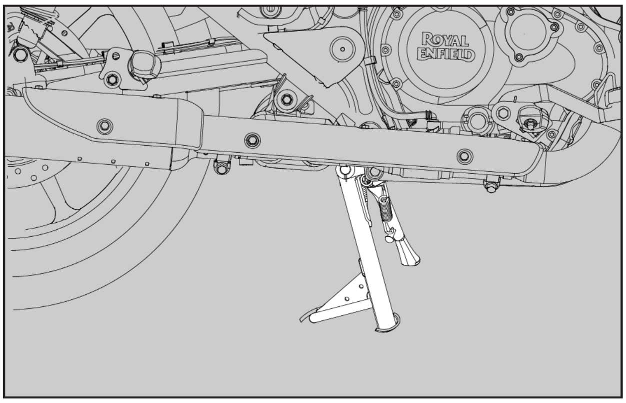


- Test lead wire (90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - Hyperlink will be given here to the chart

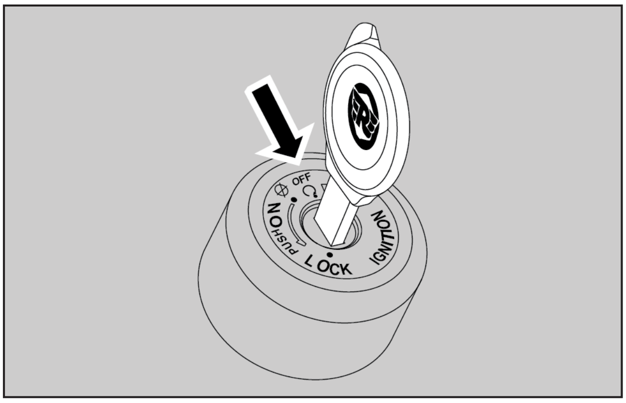
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1.Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 7.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

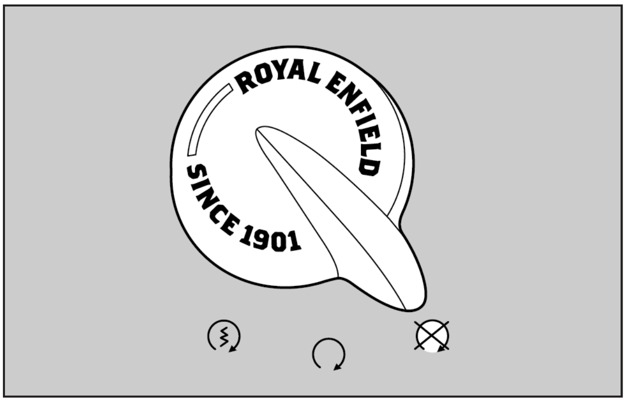
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

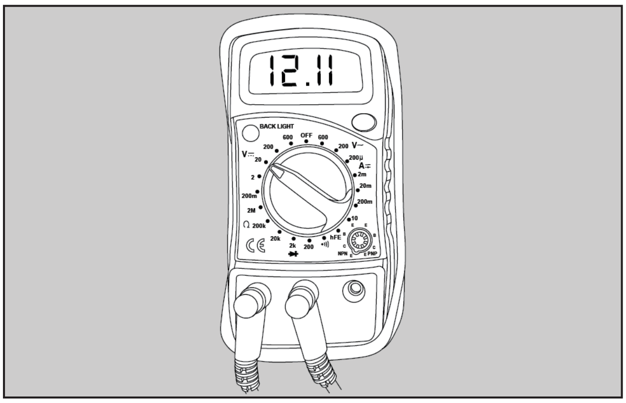


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

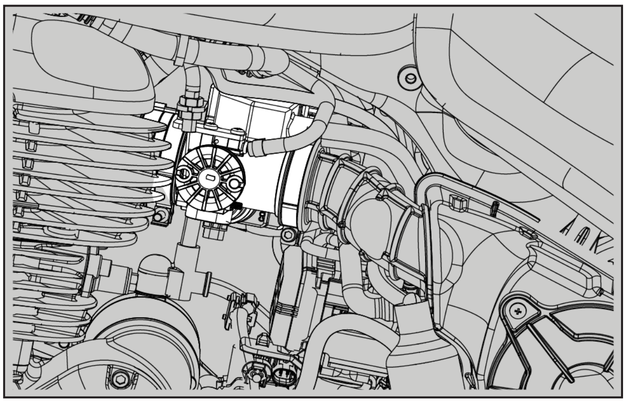
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

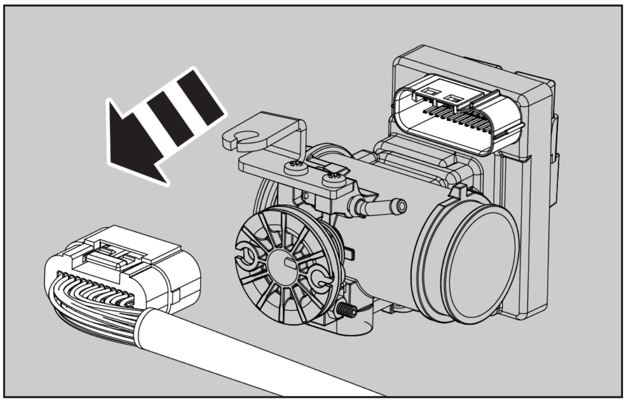
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

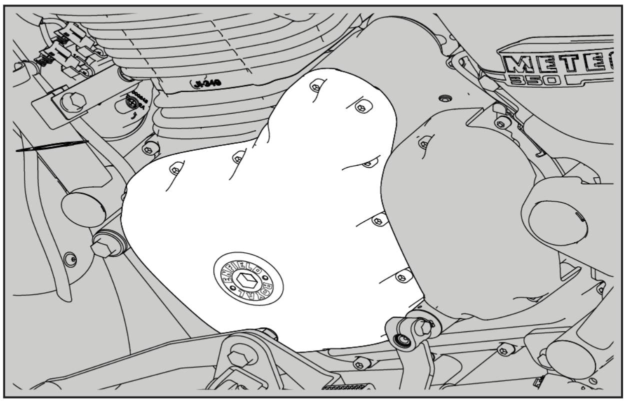
- ECU is located on the throttle body assembly



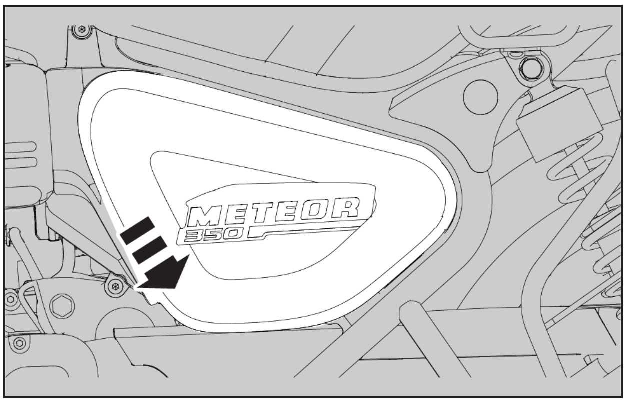
- Disconnect ECU from ECU wiring harness coupler

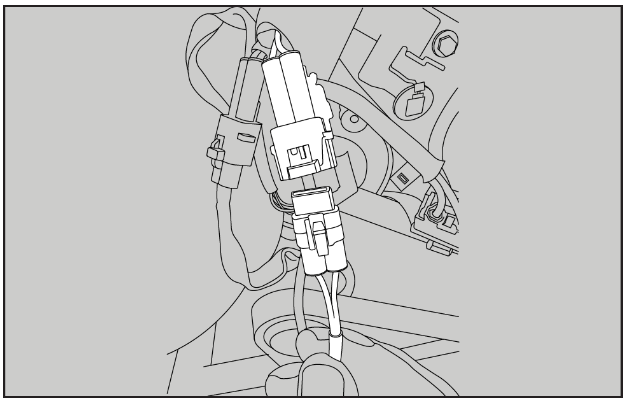


- Crank sensor coupler is located inside RH side panel bottom end



- Disconnect the Crank position sensor coupler (Black coupler).

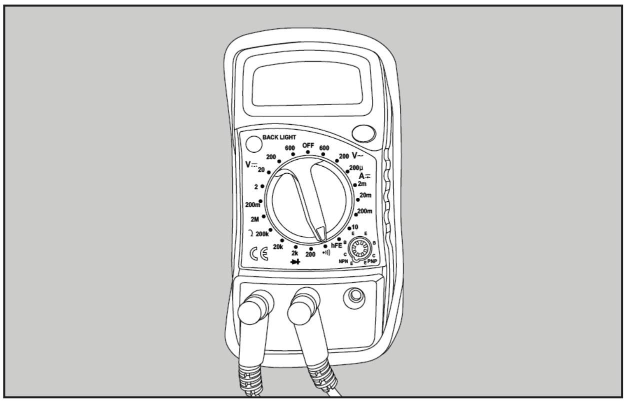




To check the Continuity of the wiring harness

STEP 1

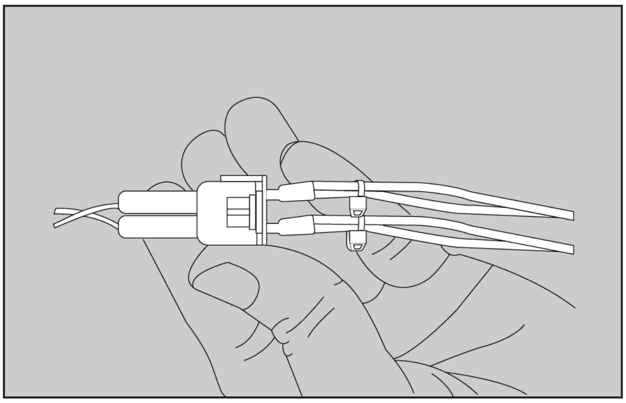
- Keep the multimeter in continuity mode.


BACK LIGHT
OFF
600
600
200
200
V⎓
V~
20
200µ
A⎓
2
2m
20m
200m
200m
2M
10
200k
20k
2k
200
hFE
NPN
PNP
CE

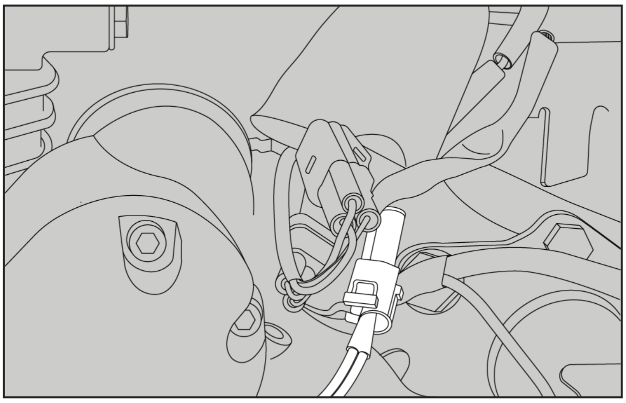
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor wiring harness coupler.

90 series (Orange Color) test lead wire with the black tag in Pin 1 of Crank position sensor wiring harness socket

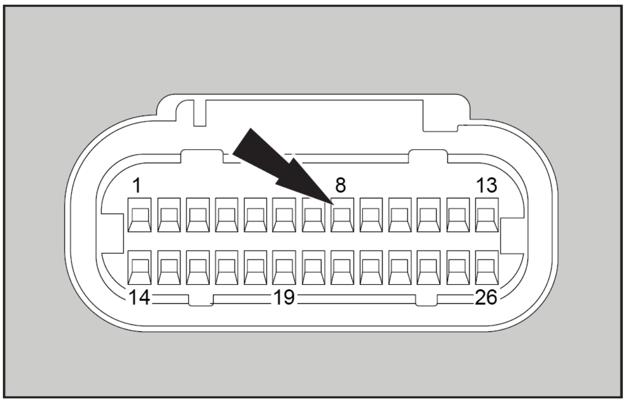
90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor wiring harness socket



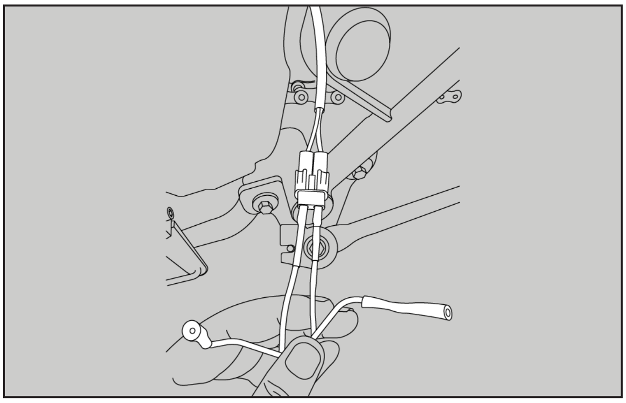
- Keep the multimeter positive probe to Pin 1 (90 series test lead wire with black tag) of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

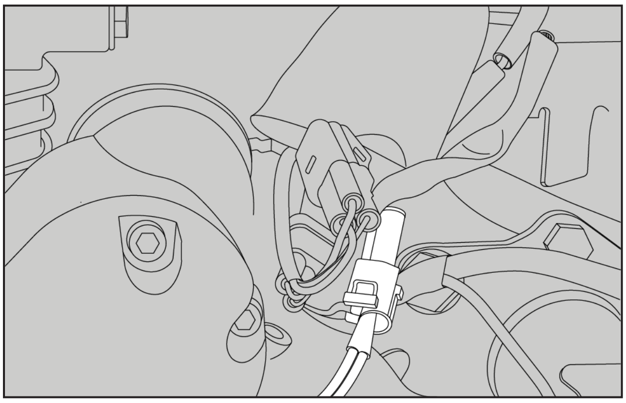


- Keep the multimeter negative probe in Pin 8 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

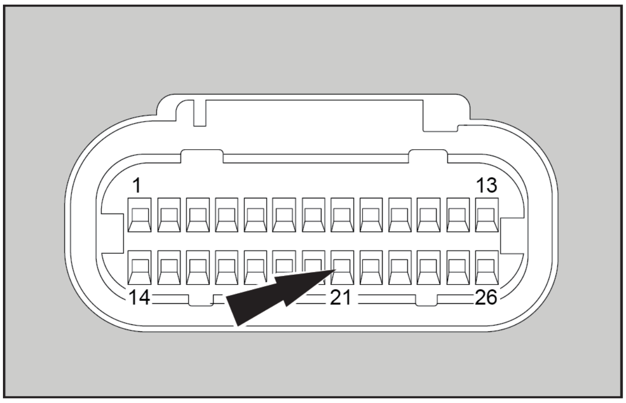


STEP 2

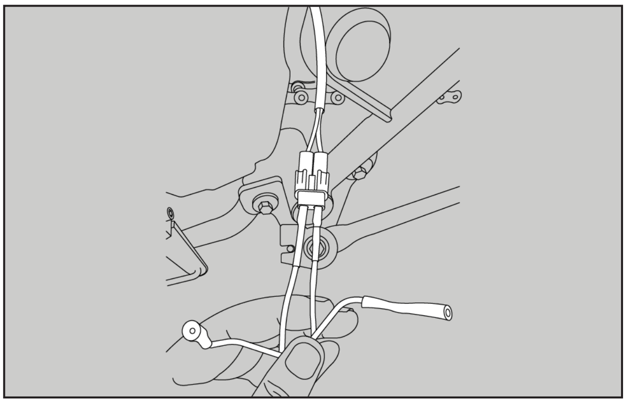
- Keep the multimeter positive probe to Pin 2 of 90 series (Orange Color) test lead wire with red tag of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 21 of the ECU wiring harness coupler



- Keep the multimeter negative probe in Pin 21 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

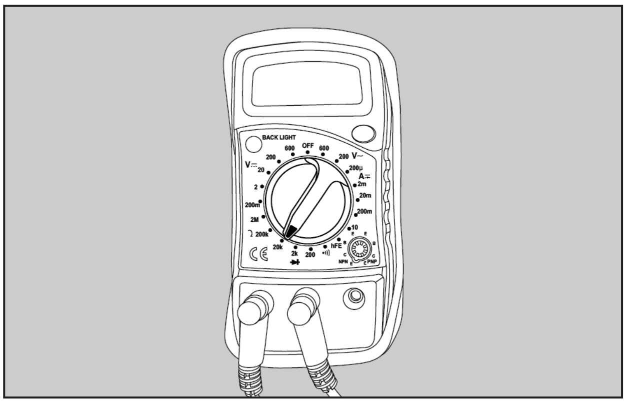


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Resistance

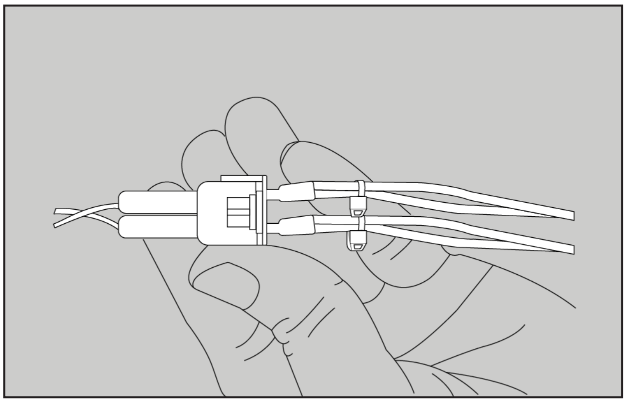
- Keep the multimeter in Resistance mode (2K ohms)



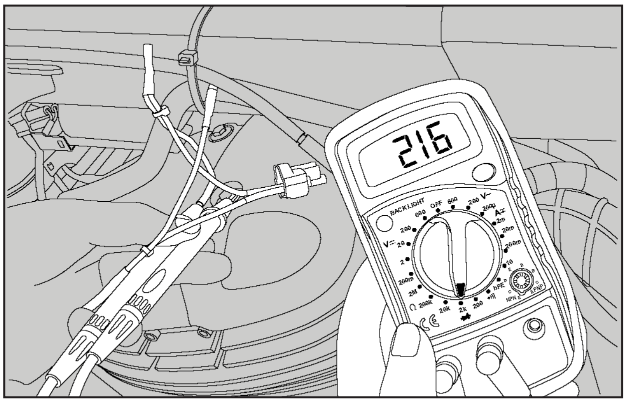
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor coupler.

90 series (orange color) test lead wire with the black tag in Pin 1 of Crank position sensor coupler

90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor coupler



- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and negative probe in Pin 2 (90 series test lead wire with red tag). Resistance value to be 205 to 225 Ohms.



⚠ CAUTION

Please ensure while disconnecting and connecting test lead wire to the couplers, ensure there is no bend or damage.

VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (205 – 225 Ohms), you replace it with the Stator coil.
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

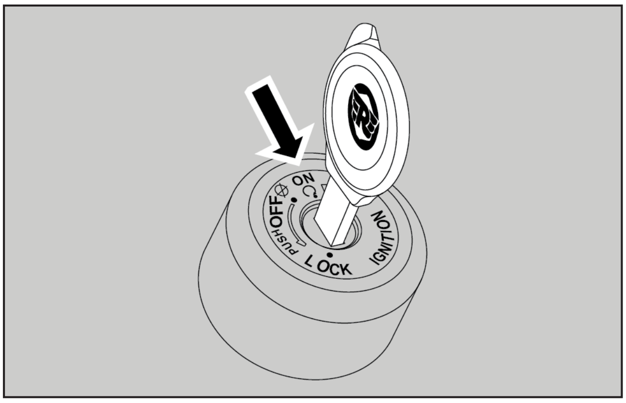
It is recommended to replace the sensor /ECU / wiring harness as per the advice from Royal Enfield only.

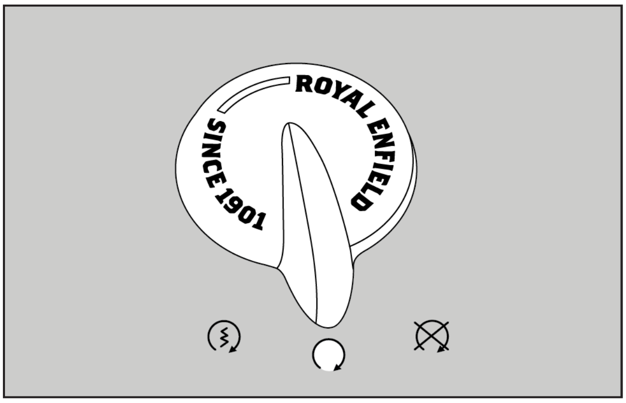
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0413 - SECONDARY AIR VALVE

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0413	Secondary air valve	Secondary air valve Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Secondary air valve is also called as Secondary air injection valve

TROUBLE CODE : DTC CODE: P0413

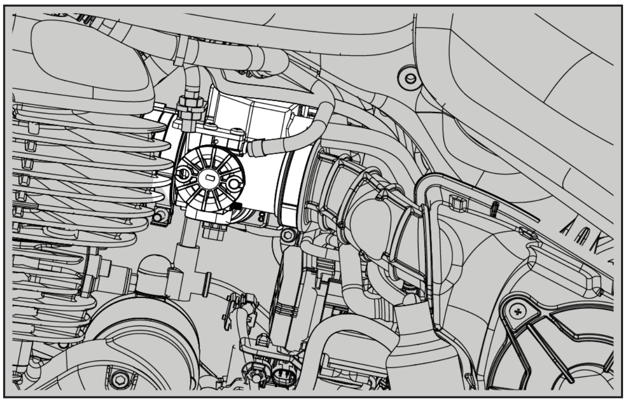
Type of error : Secondary air valve Circuit high

(i) Information :Secondary air valve circuit fault / Secondary air valve internal fault

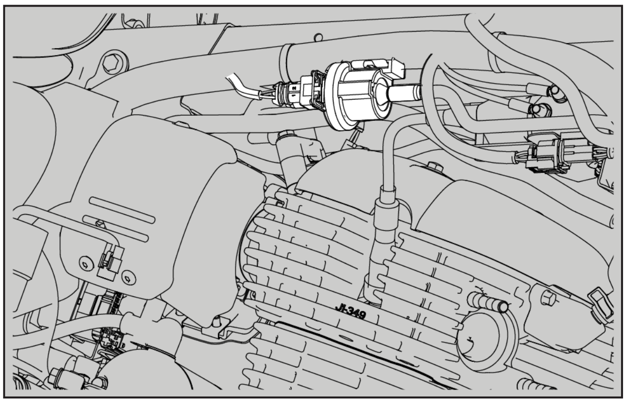
b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

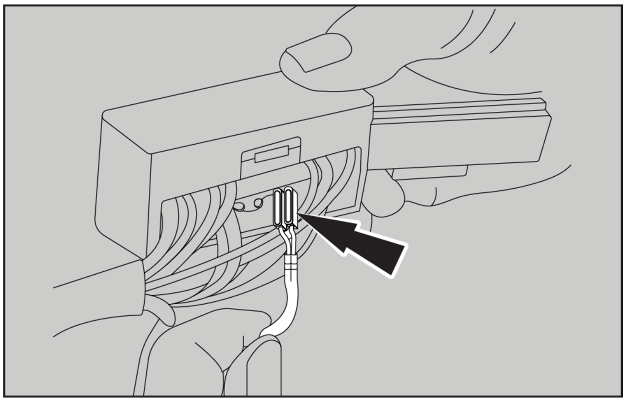
- ECU is located on the throttle body assembly



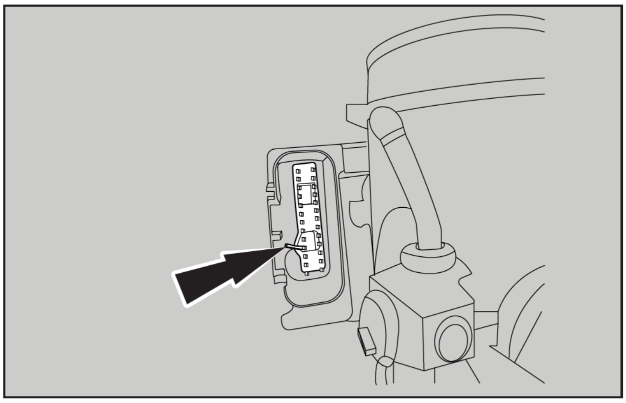
- Secondary air valve is located on the frame under the fuel tank



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers , if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts .If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

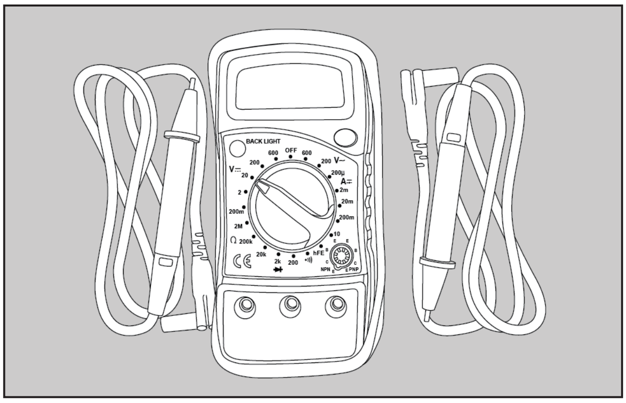
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

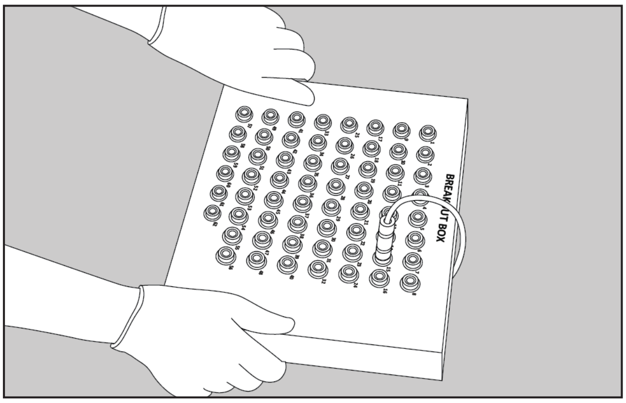
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

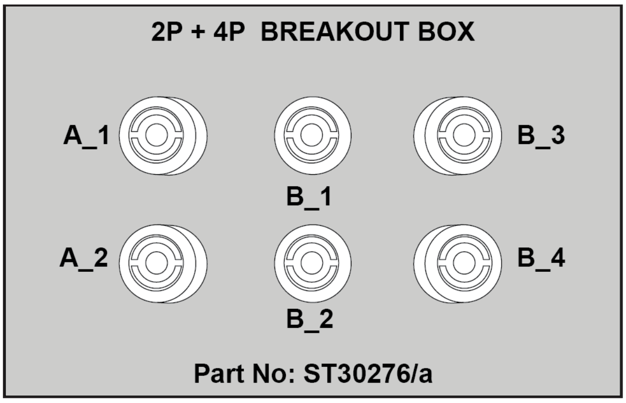
- **Tools Required**
- Multimeter (Universal)



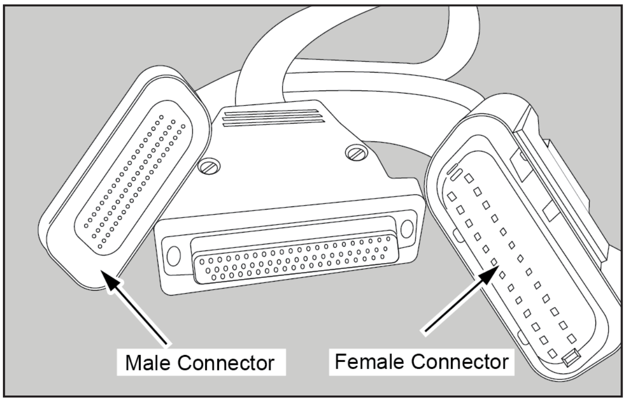
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

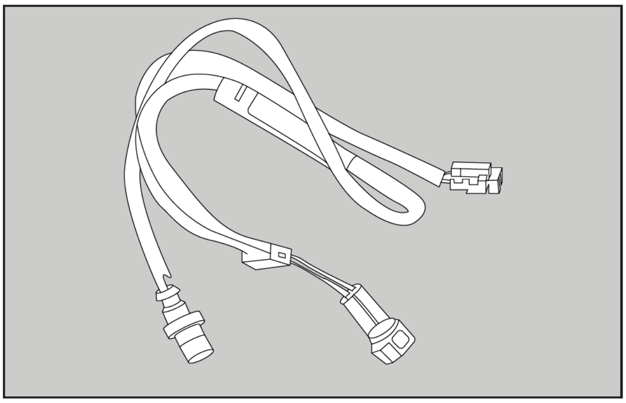
- Breakout Box (2P+4P Sensor Breakout box - ST302676/A)


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 Pin ECU Breakout Box Harness (ST30923/A)

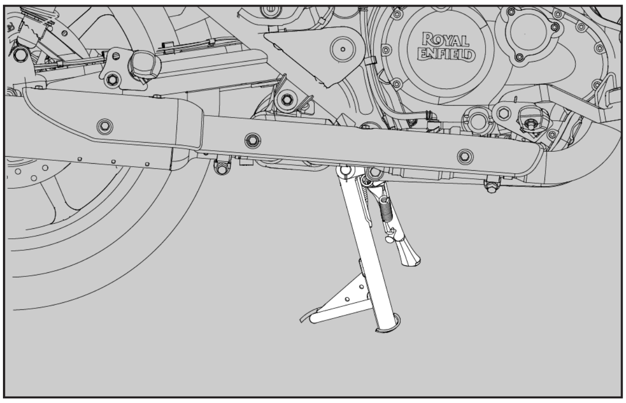

Male Connector
Female Connector

- Oxygen sensor (4P) Breakout Box Harness (ST30923/A)

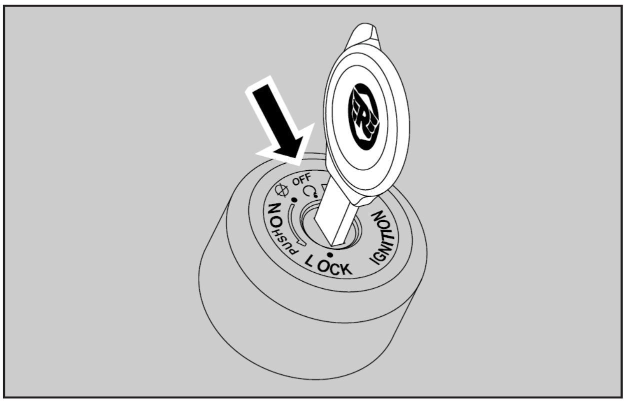


b. Pre-Checks:

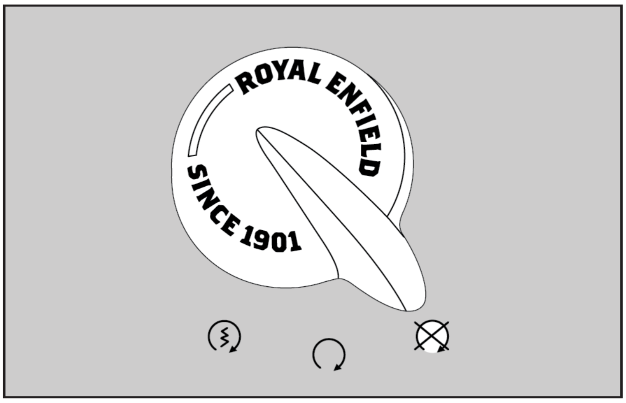
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

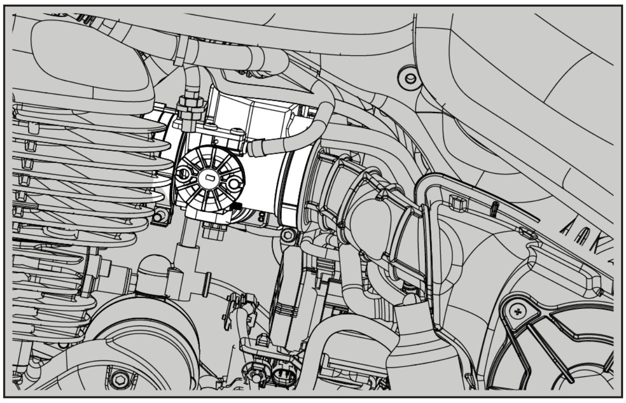
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve coupler*

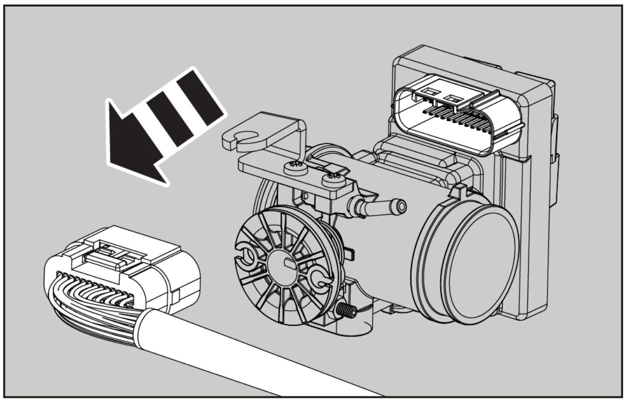
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

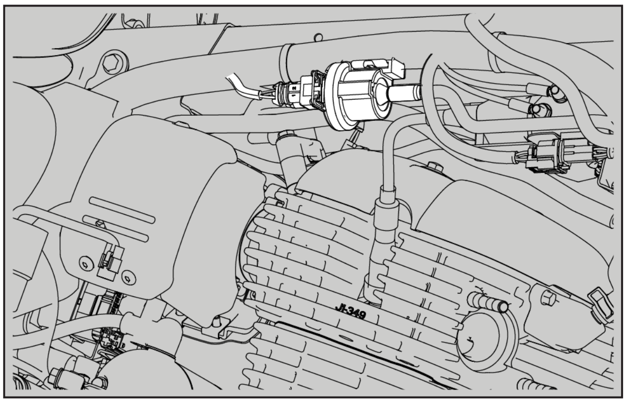
- ECU is located in the throttle body assembly



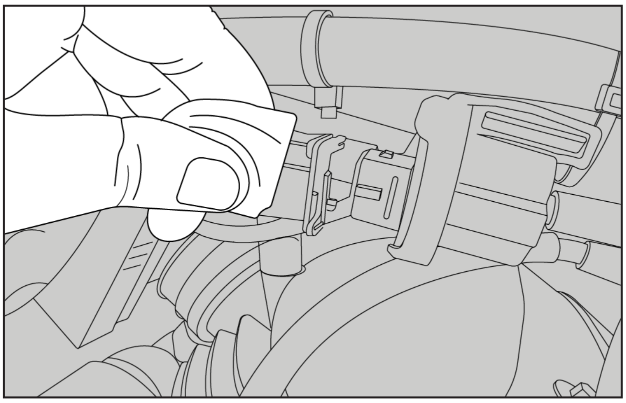
- Disconnect ECU from ECU wiring harness coupler

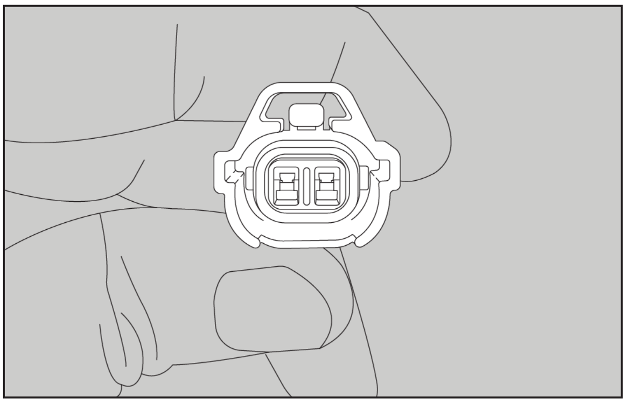


- Secondary air valve is located on the frame under the fuel tank

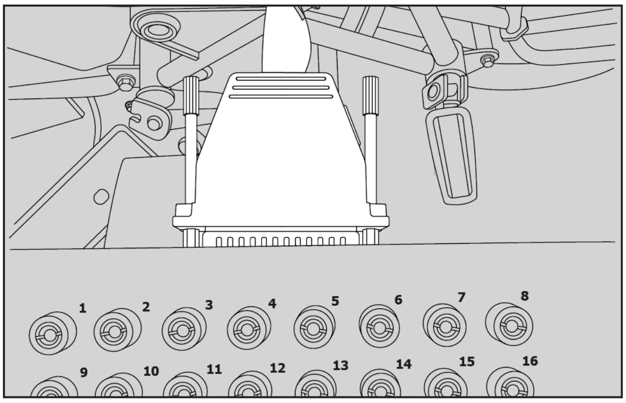


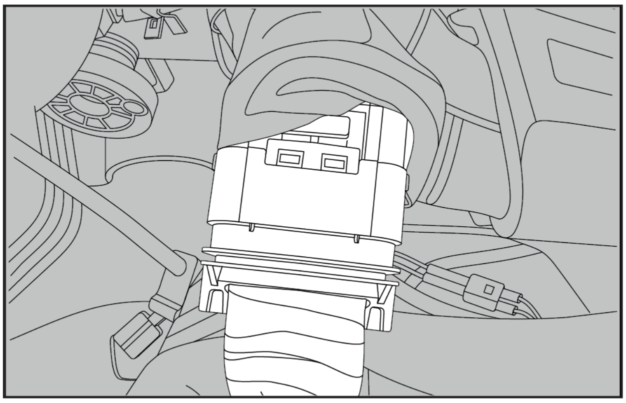
- Disconnect the Secondary air valve coupler.



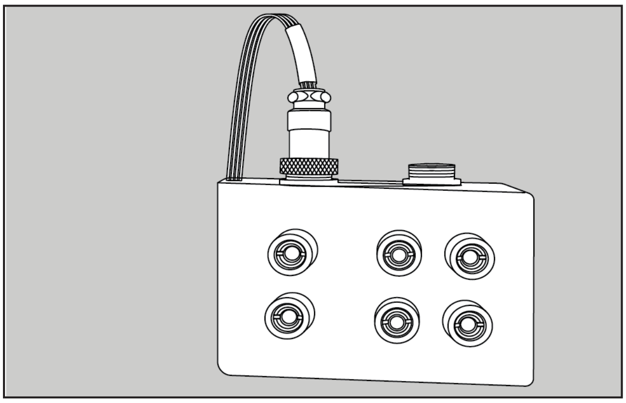


- Connect ECU break out box (62 Pin) kit to Breakout box Harness



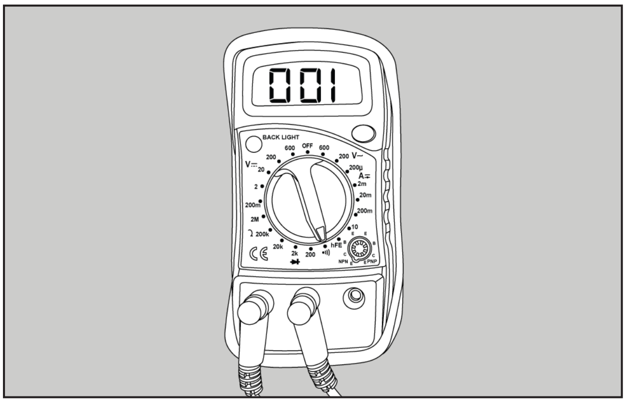


- Connect sensor Breakout Box (2P+4P Pin) to Secondary air valve breakout box harness kit

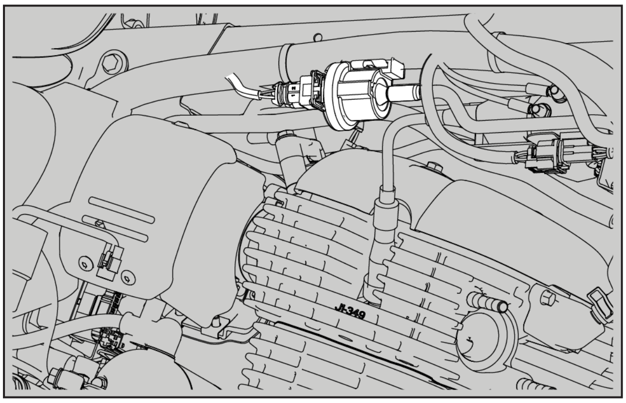


To Check Continuity of Wiring harness

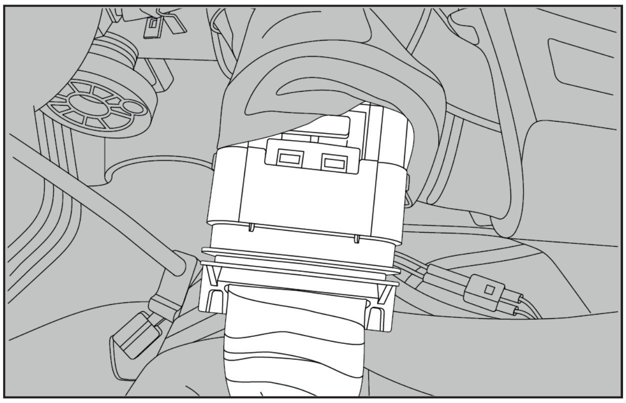
- Keep the multimeter in Continuity mode



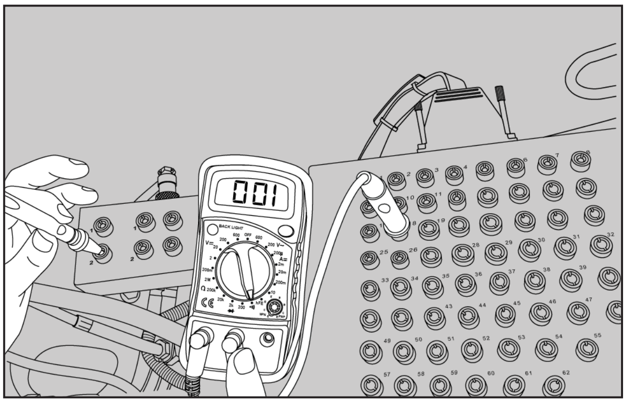
- Connect the Secondary air valve breakout box harness to Secondary air valve wiring harness coupler



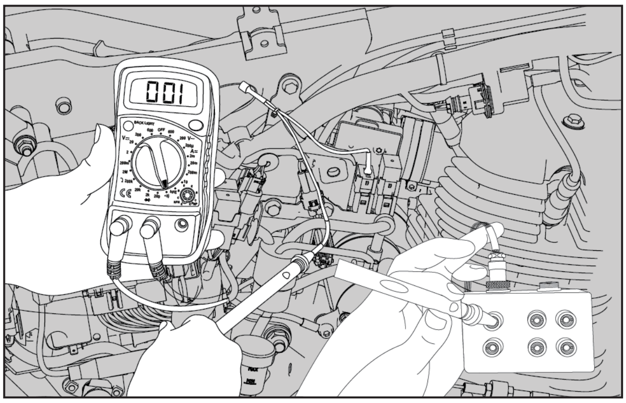
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler

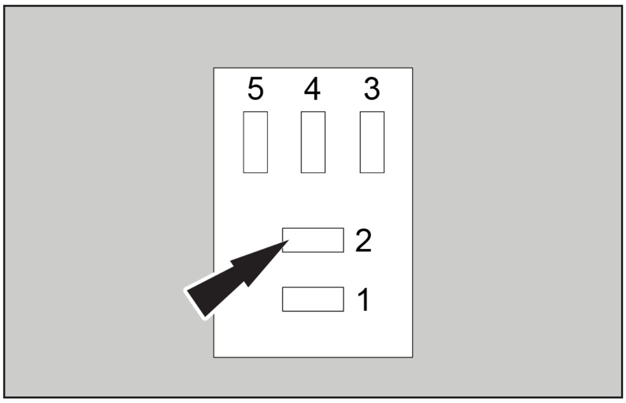


- Keep the positive probe of the multimeter in socket 2 of the sensor break out box and negative probe in socket 9 of ECU breakout box. Check for continuity (Beep sound from multimeter)



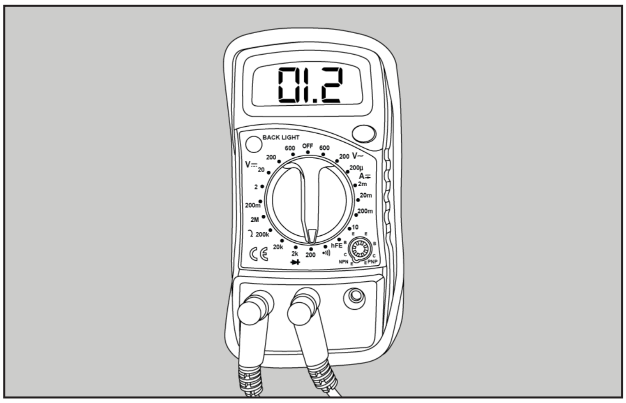
- Keep the positive probe of multimeter in Socket 1 of the Sensor break out box and negative probe in pin 2 of the Power relay and check for continuity (Beep sound from multimeter)



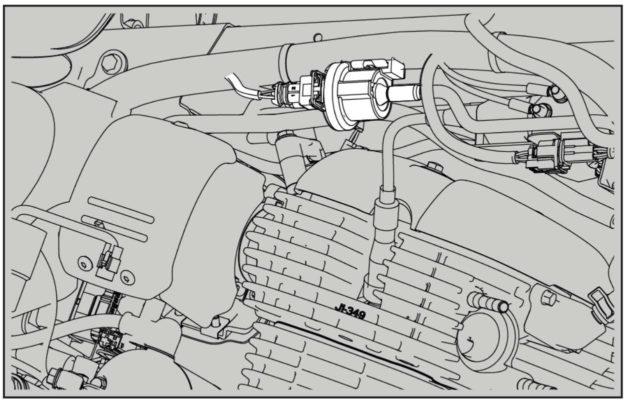


To Check the Resistance

- Keep the multimeter in Resistance mode (200 ohms)



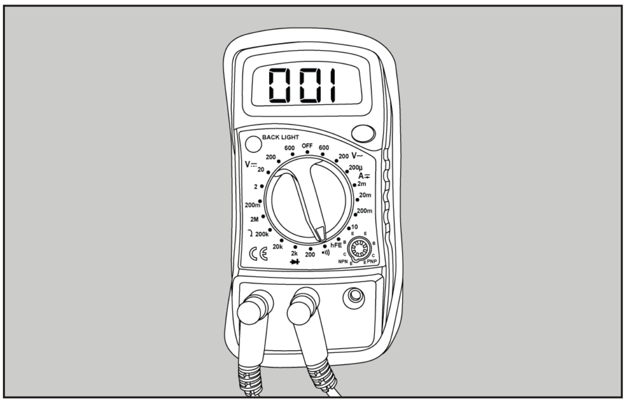
- Connect the Secondary air valve breakout box harness coupler and connect it to the Secondary air valve coupler



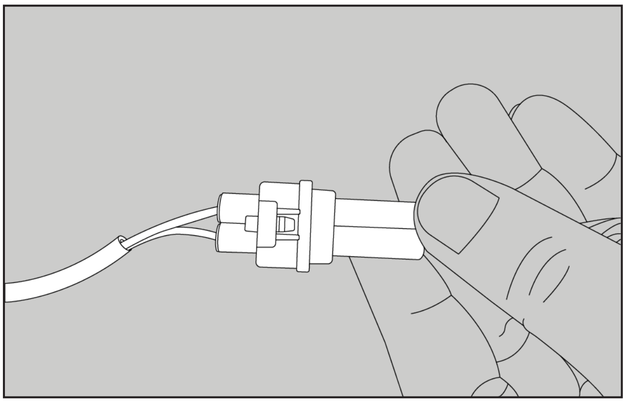
- To check the Resistance value of the Secondary air valve, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box. The resistance value is to be 24.2 to 27.8 Ohms @ 30 5 °C

To Check the Input voltage

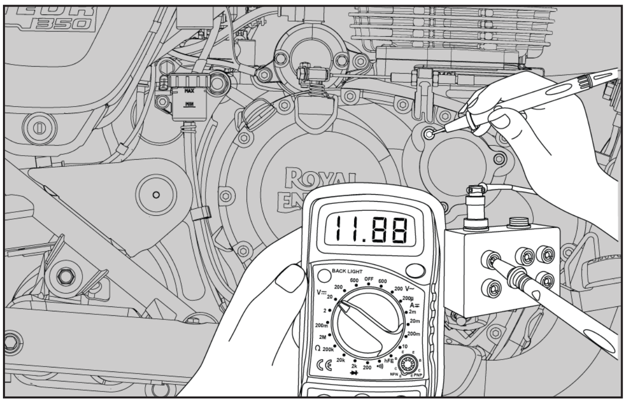
- Keep the multimeter in Voltage mode (20 V)



- Connect the Secondary air valve wiring harness coupler to Secondary air valve breakout harness coupler .



- To check voltage at the wiring kit end, place the positive probe of the multimeter in Socket 1 of the Sensor break out box and place the negative of the multimeter to body ground. Turn "ON"the ignition and kill switch and you will be able to see the voltage of the battery and it should be 12 V in the multimeter.



d. DECISION POINT:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (24.2 to 27.8 Ohms), you replace with Secondary air valve
- If the input voltage is meeting the specified limit and resistance is within the specified limit and if continuity is available then you have to replace the ECU

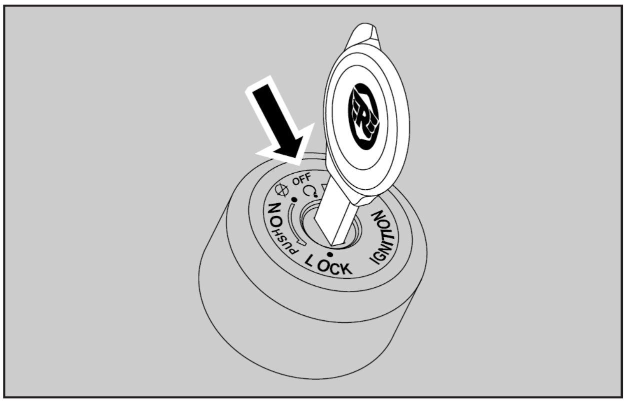
It is recommended to replace the secondary Air Valve /ECU / Wiring Harness as per the advice from Royal Enfield only

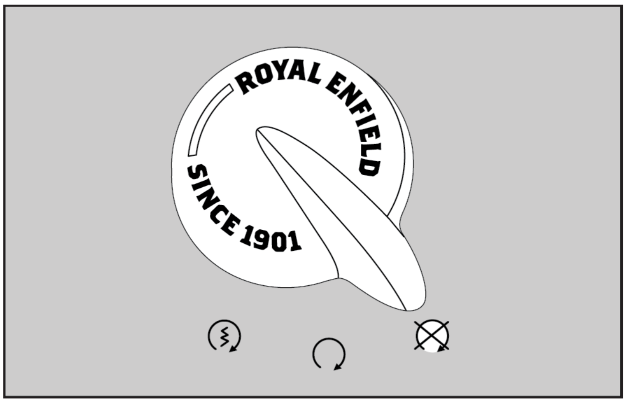
d. DECISION POINT:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

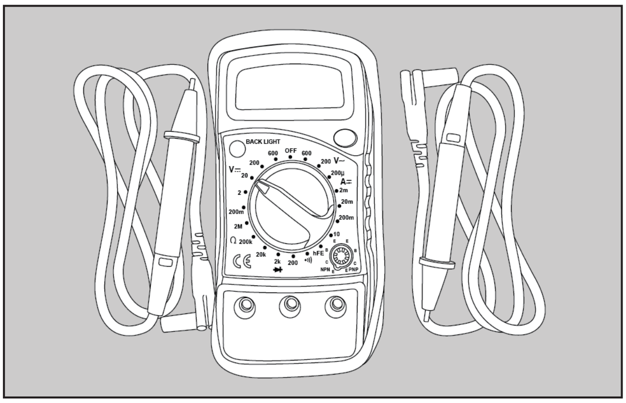
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

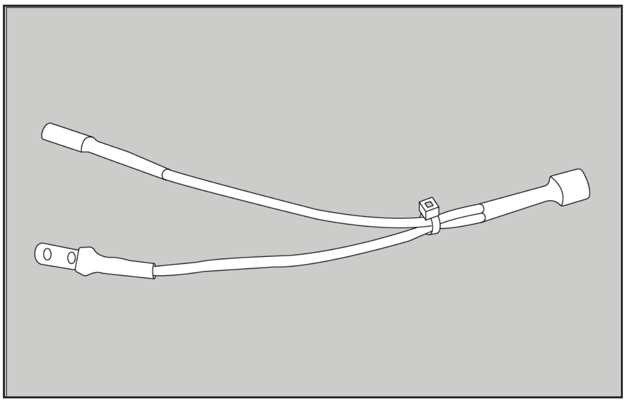
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire are inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the system components.**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting etc.**

Tools Required

- Multimeter (Universal)



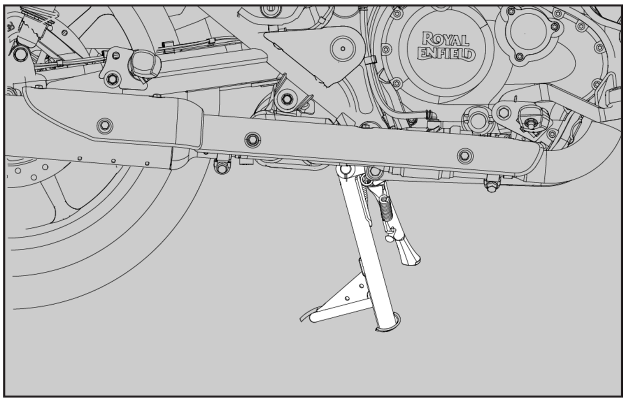
- Probe/Test lead wire(110 SERIES - Black Color wire)
- Probe/Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler



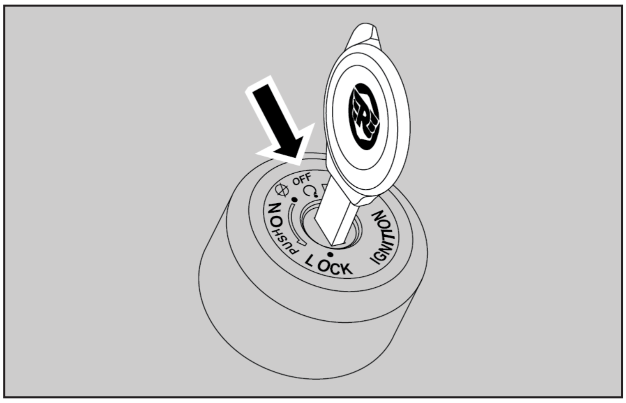
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

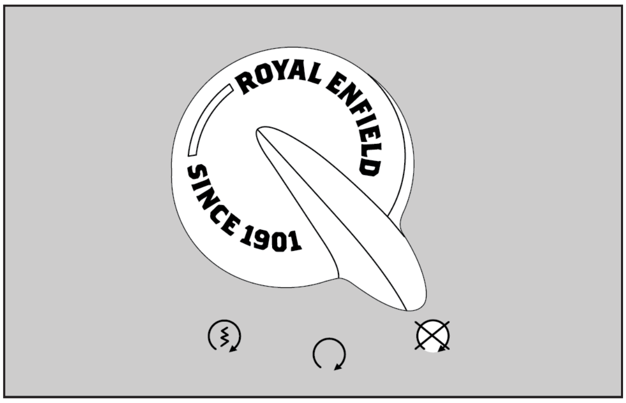
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

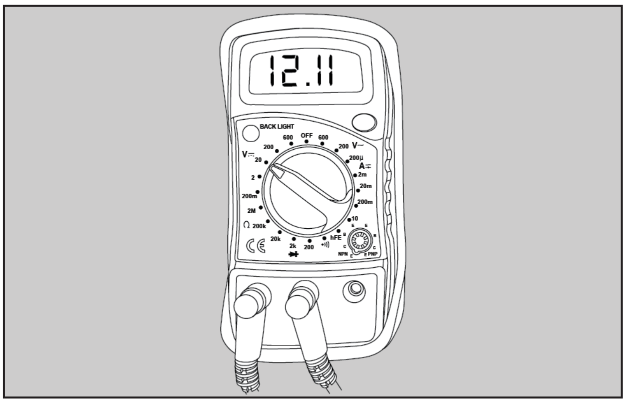


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION
Failure to adhere to the above pre-check points may cause damage to the EMS system.After Ensuring above precondition only you are advised to proceed for the steps mentioned below

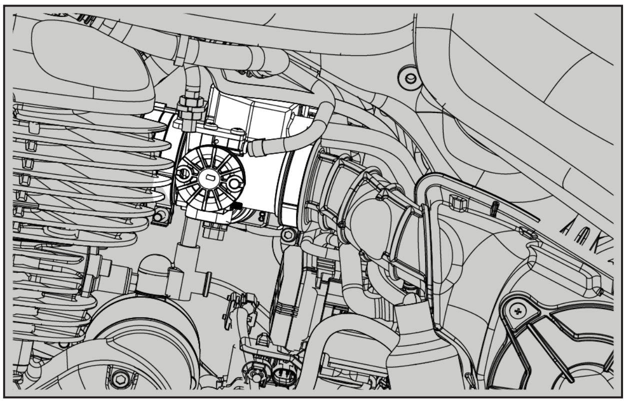
c. Diagnostics:

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

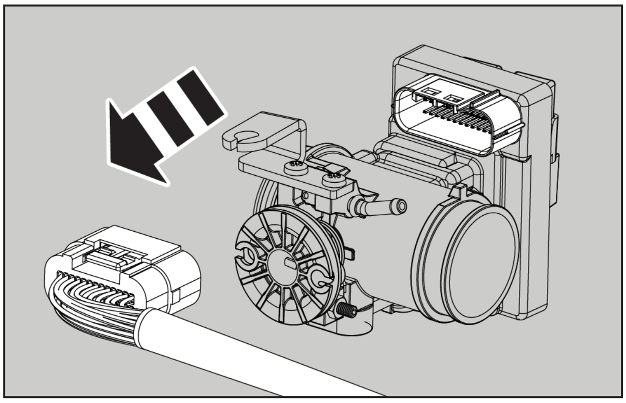
NOTE
• *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

NOTE
• *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

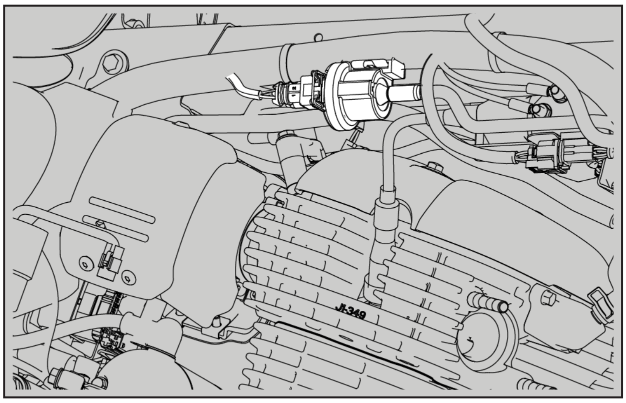
- ECU is located on the throttle body assembly



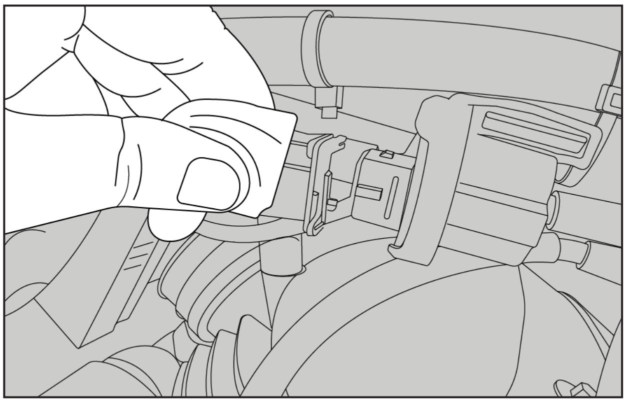
- Disconnect ECU from ECU wiring harness coupler

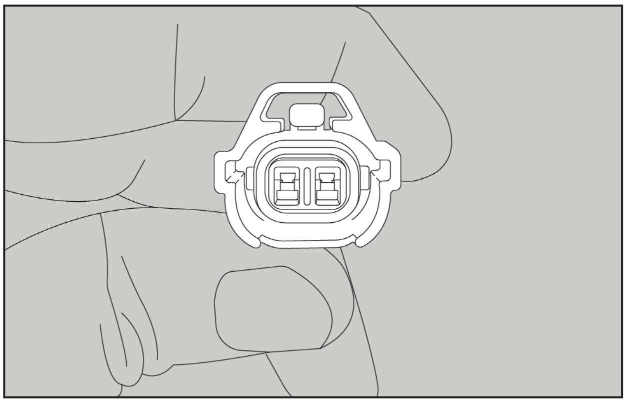


- Secondary air valve is located on the frame under the fuel tank



- Disconnect the Secondary air valve coupler.

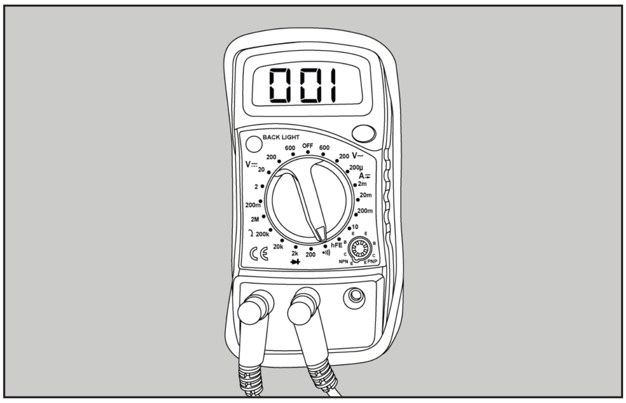




To check the Continuity of the wiring harness

STEP 1

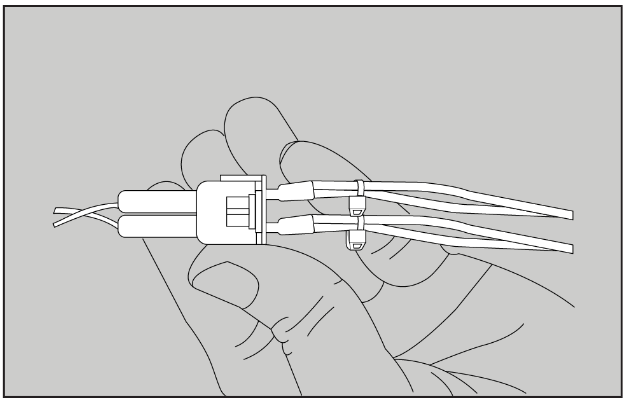
- Keep the multimeter in continuity mode.


001
BACK LIGHT
600
OFF
600
200
V
A
hFE
2M
200k
20k
2k
200

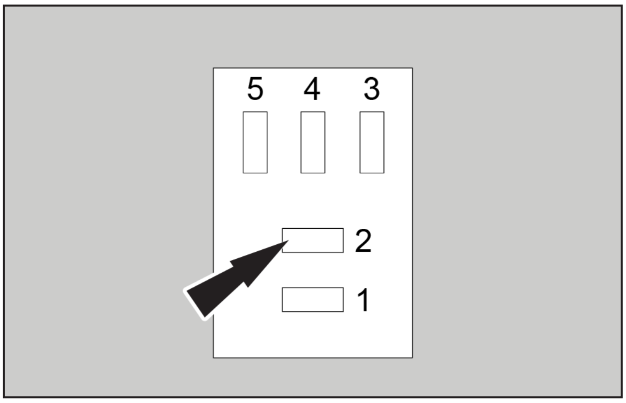
- Connect the Test lead wires 110 series (Black color) in the secondary air valve wiring harness coupler.

110 series (Black color) test lead wire with black tag in Pin 1 of secondary air valve wiring harness coupler

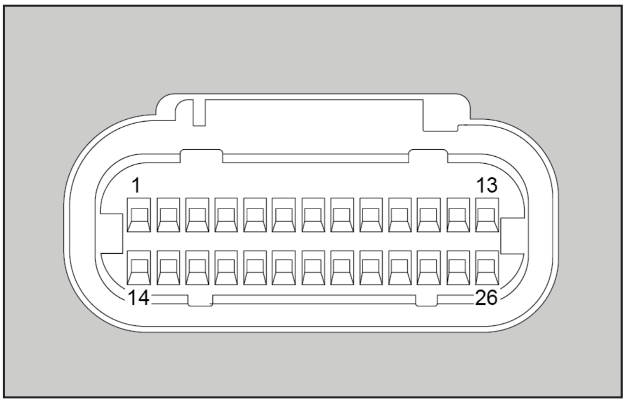
110 series (Black color) test lead wire with red tag in Pin 2 of secondary air valve wiring harness coupler



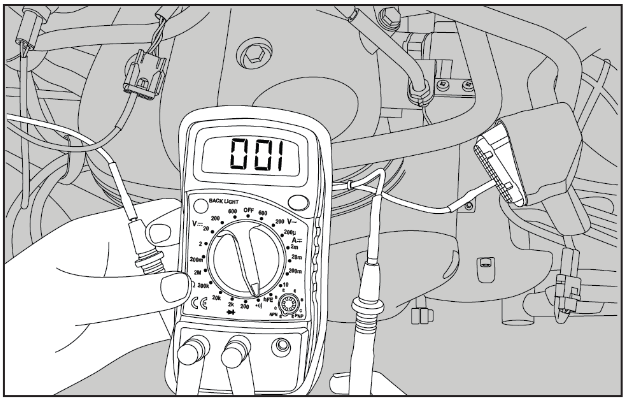
- Keep the multimeter positive probe to Pin 2 (test lead wire with red tag) of the Secondary air valve wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

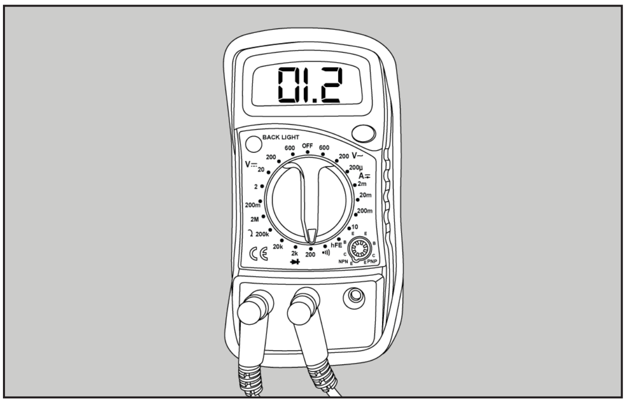


- To check continuity, keep the negative probe in Pin 9 of ECU wiring harness coupler (Test lead wire 40 series yellow colour with black tag) .Check for continuity (Beep sound from multimeter)



To check the Resistance

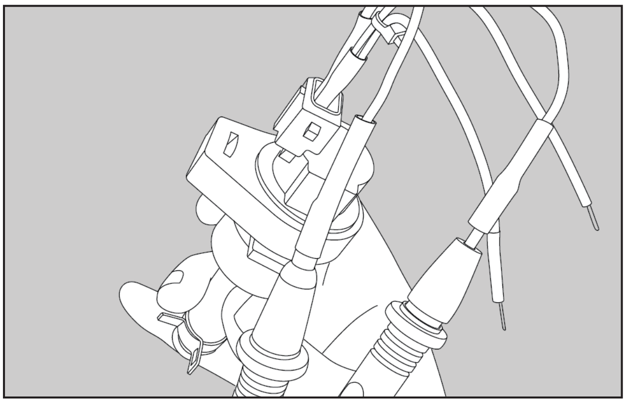
- Keep the multimeter in Resistance mode



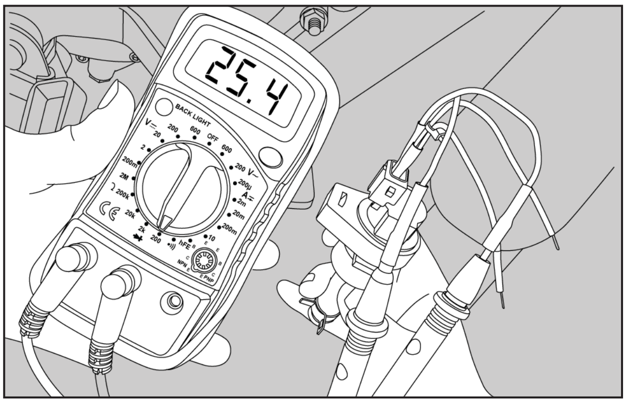
- Connect the Test lead wires 110 series (black colour) in the Secondary air valve coupler.

110 series (black color) Test lead wire with black tag in Pin 1 of Secondary air valve coupler

110 series (black color) Test lead wire with red tag in Pin 2 of Secondary air valve coupler

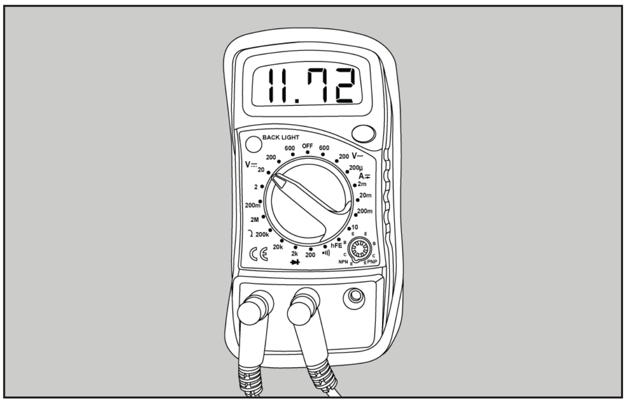


- Keep the multimeter positive probe in Pin 1 (Test lead wire with Black tag) and negative probe in Pin 2 (Test lead wire with red probe). Resistance value to be 24.2 to 27.8 Ohms @ 30 5 °C.

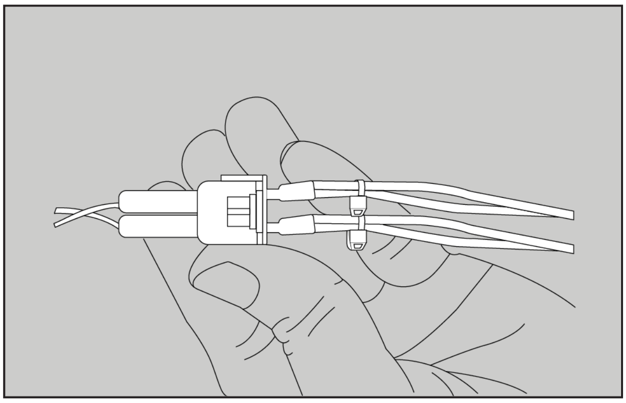


To check the Input voltage

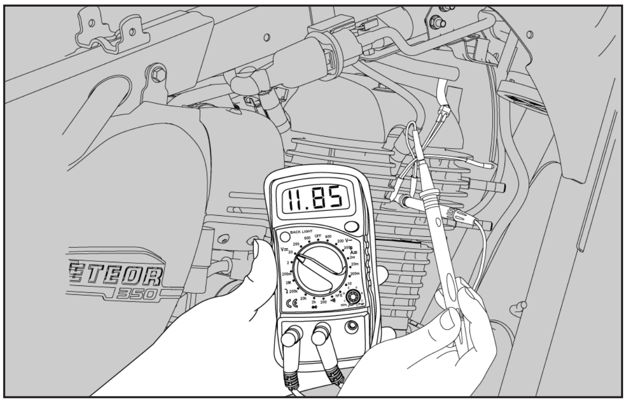
- Keep the multimeter in voltage mode



- Connect the Test lead wires 110 series (black color) in the Secondary air valve wiring harness coupler.
- 110 series (black color) Test lead wire black tag in Pin 1 of secondary air valve wiring harness coupler
- 110 series (black color) test lead wire red tag in Pin 2 of secondary air valve wiring harness coupler



- Connect the multimeter positive probe to pin 1(110 series Test lead wire black colour with Black tag) and negative to body ground in the wiring harness coupler and turn "ON" the ignition and kill switch. The voltage should be equal as the battery voltage (12 V).



d. Decision Point:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (24.2 to 27.8 Ohms @ 30 5 °C), you replace with Secondary air valve
- If the voltage is meeting the specified limit and if continuity is available you have to replace the ECU.

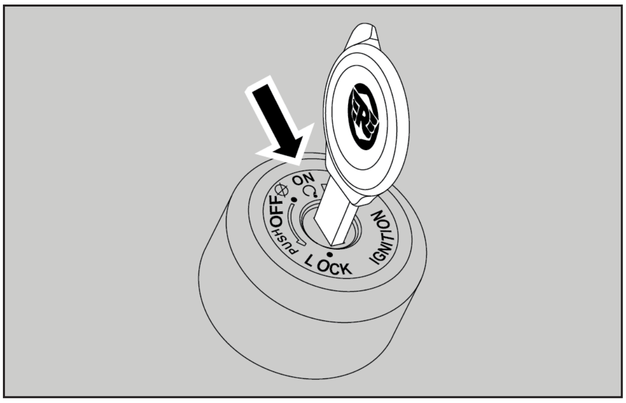
It is recommended to replace the secondary Air Valve /ECU / Wiring Harness as per the advice from Royal Enfield only

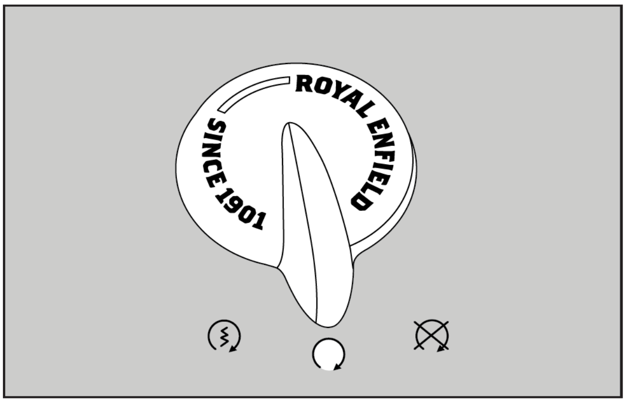
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0459 - CANISTER PURGE SOLENOID DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0459	Canister purge solenoid	Canister purge solenoid Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Canister purge solenoid is also called a Canister purge valve

TROUBLE CODE : DTC CODE: P0459

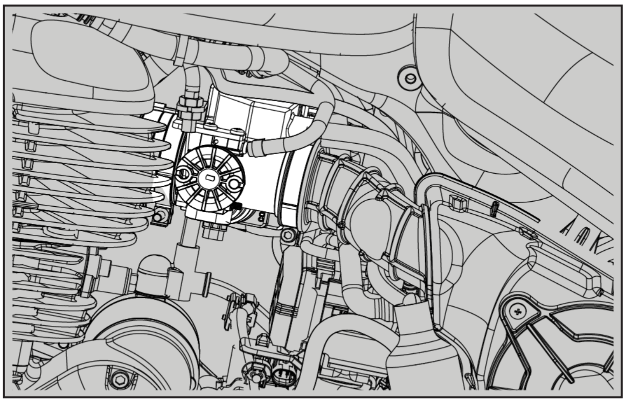
Type of error : Canister purge solenoid Circuit High

(i) Information: Canister purge solenoid circuit fault / Canister purge solenoid internal fault

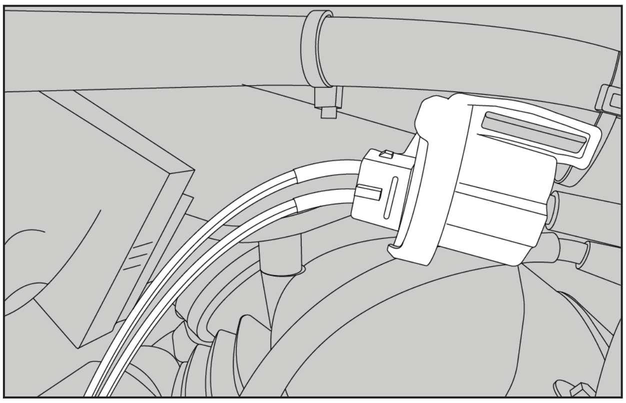
b.Preliminary Checks (Basic Check Points):

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

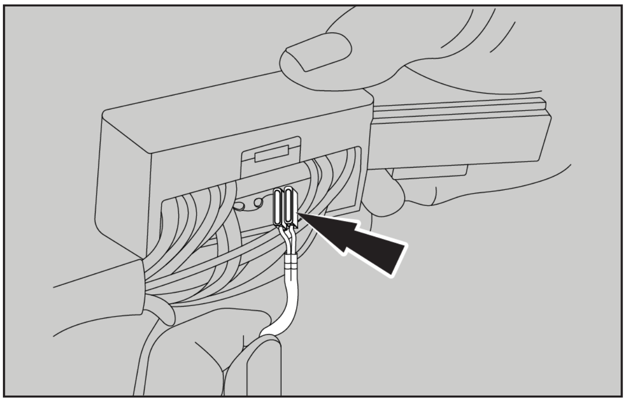
- ECU is located on the Throttle body Assembly



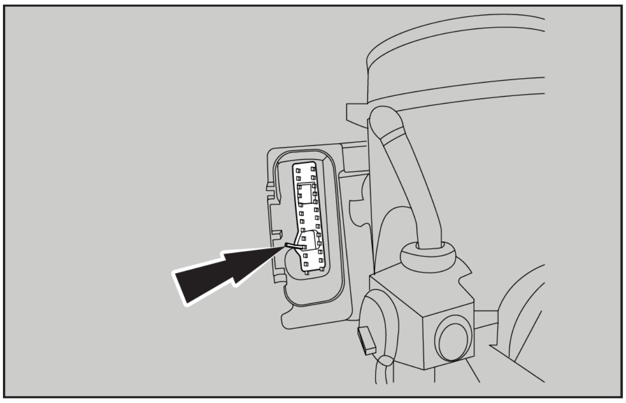
- Canister purge solenoid is located on the frame below the fuel tank



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

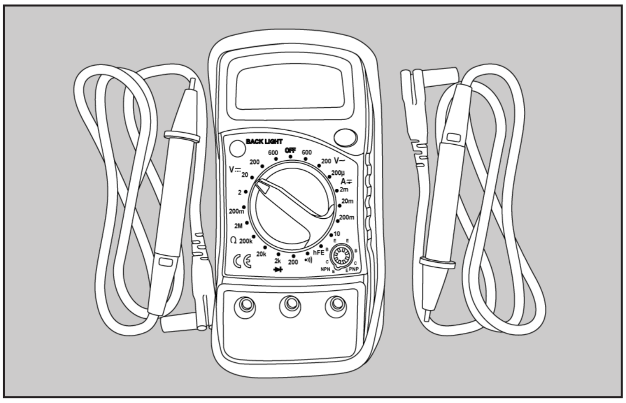
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

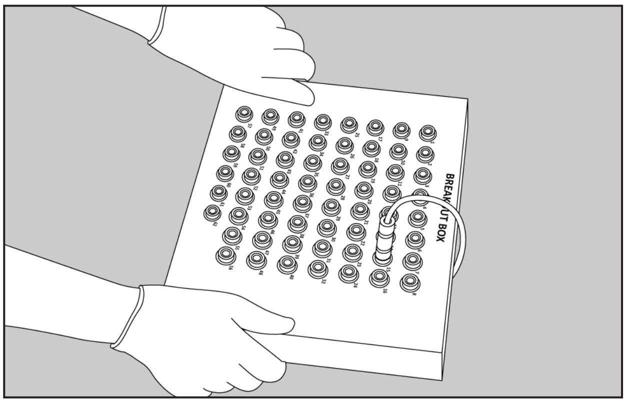
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

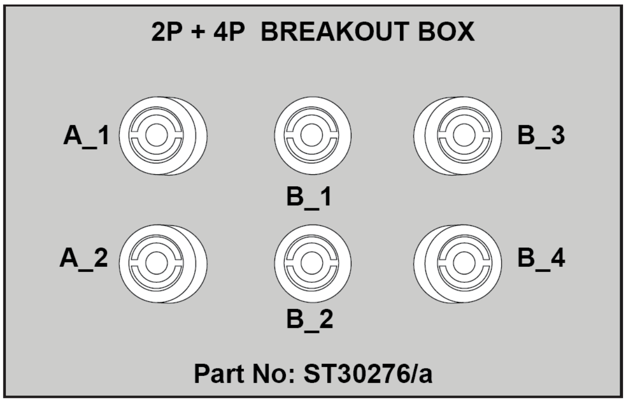
- **Tools Required**
- Multimeter (Universal)



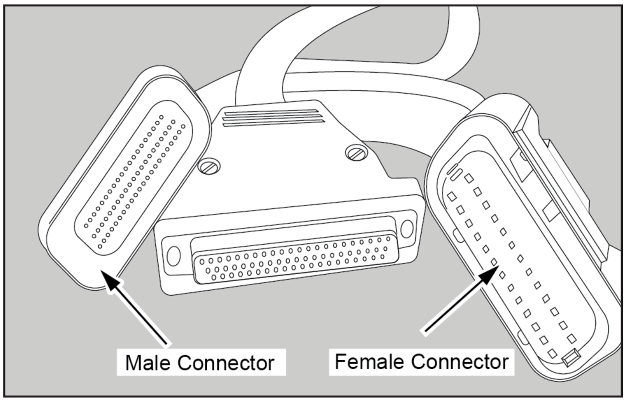
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

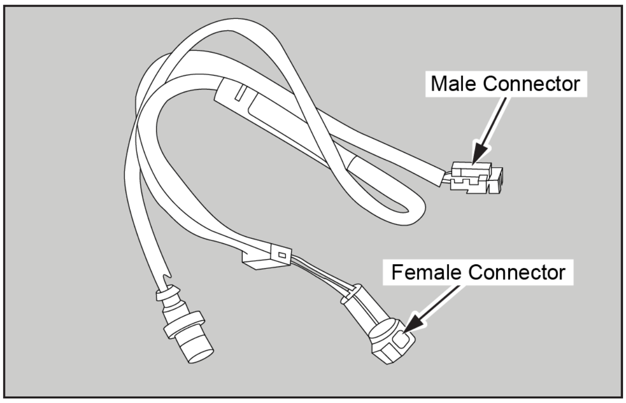
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

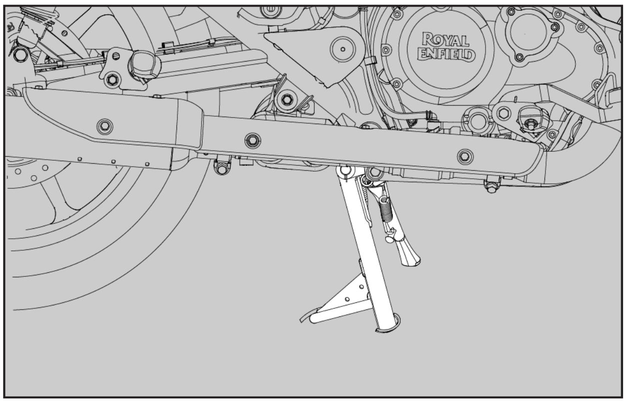

Male Connector
Female Connector

- SAI /Canister purge valve (2P) -Sensor breakout box harness-ST30924/A

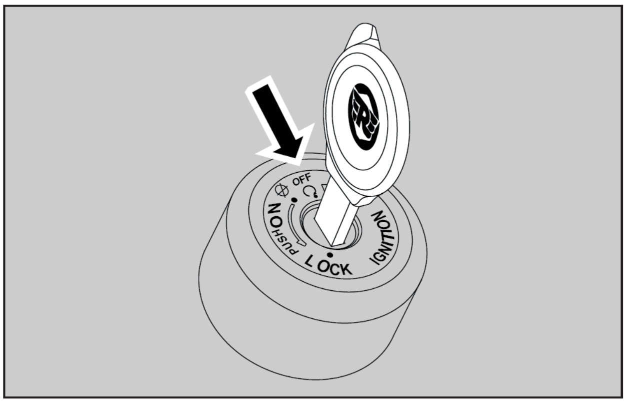

Male Connector
Female Connector

b. Pre-Checks:

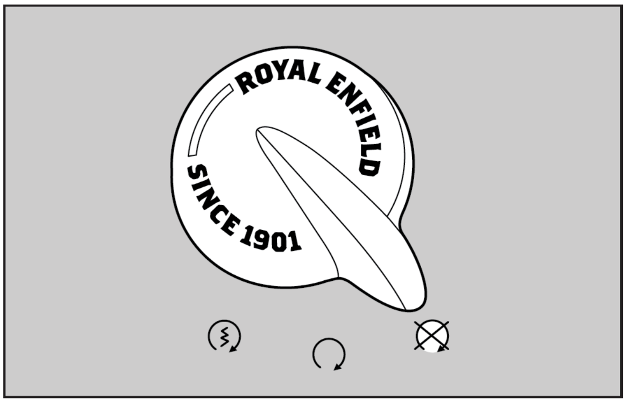
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH
ON
LOCK
IGNITION

- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

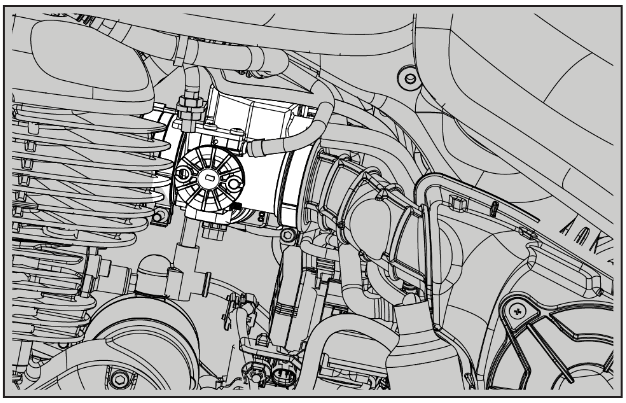
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Canister purge solenoid coupler*

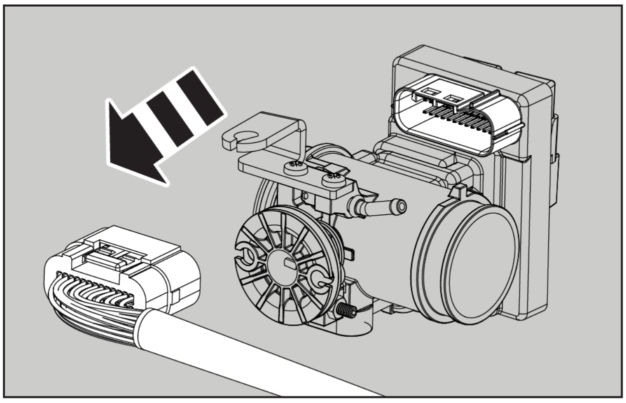
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

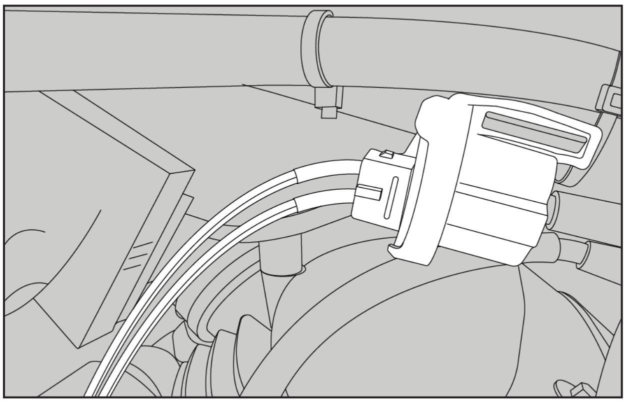
- ECU is located in the throttle body assembly



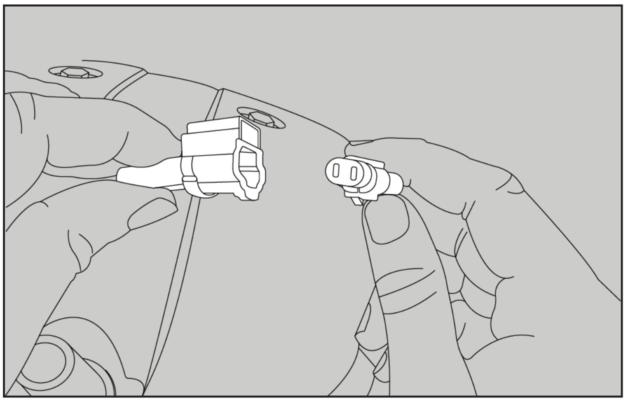
- Disconnect ECU from ECU coupler.



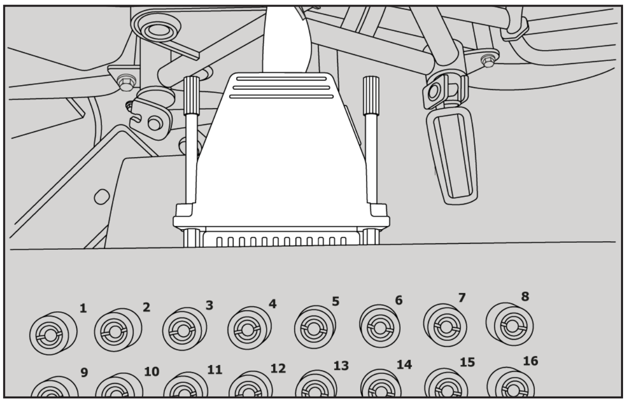
- Canister purge solenoid is located on the frame below the fuel tank



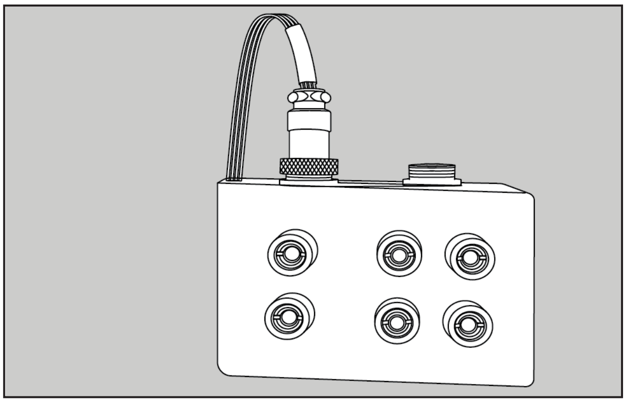
- Disconnect Canister purge solenoid coupler.



- Connect ECU break out box (62 Pin) kit to Breakout box Harness

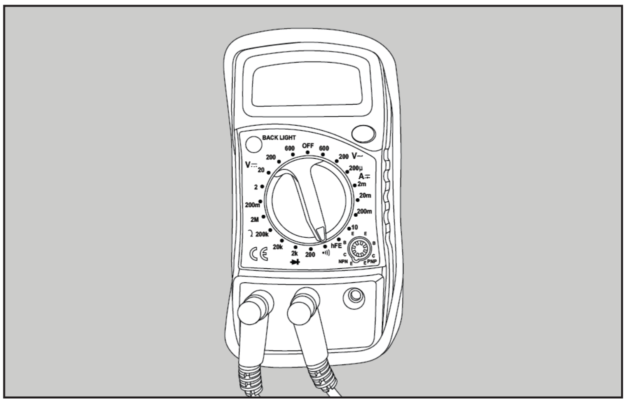


- Connect Breakout Box (2P+4P Pin) to Canister purge solenoid breakout box harness kit

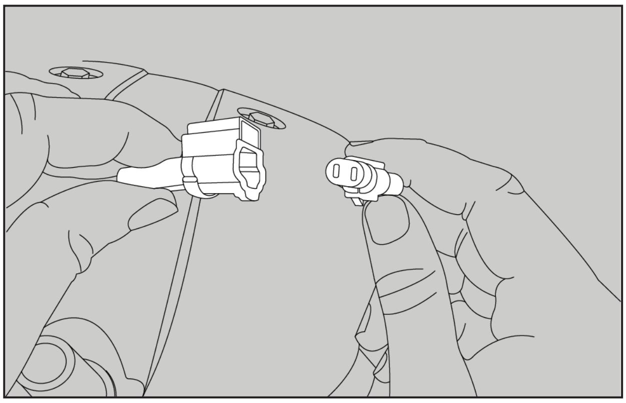


To Check Continuity of Wiring harness

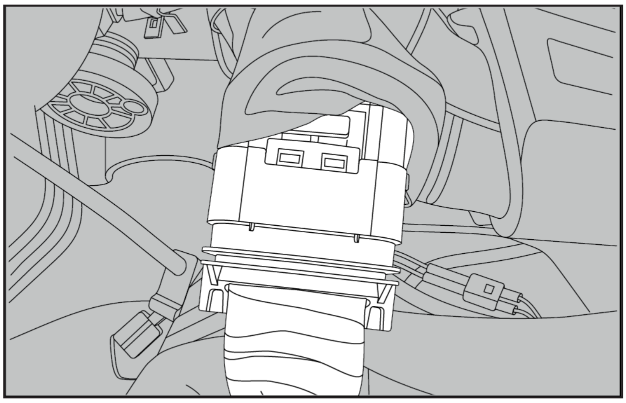
- Keep the multimeter in Continuity mode



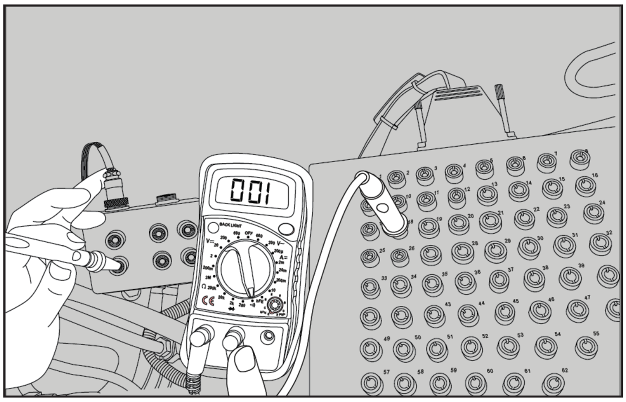
- Connect the Sensor breakout box harness to Canister purge solenoid wiring harness coupler



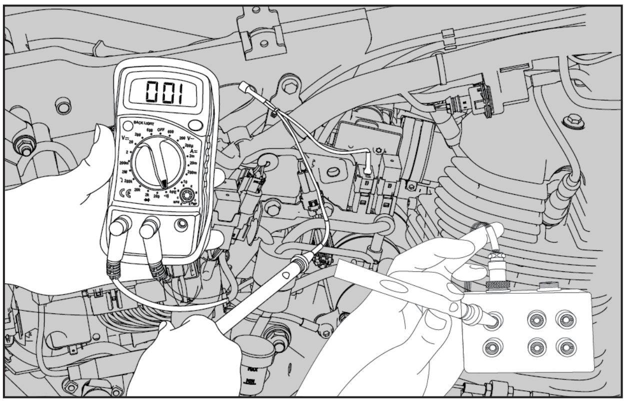
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler

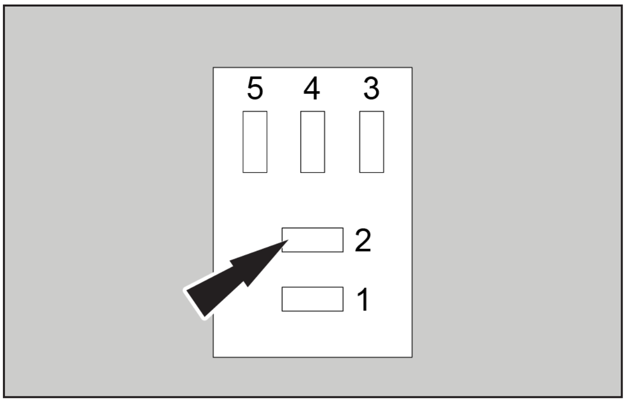


- To check continuity, keep the positive probe of the multimeter in socket 2 of the Canister purge valve breakout box and negative probe in socket 18 of the ECU breakout box. Check for continuity (Beep sound from multimeter)



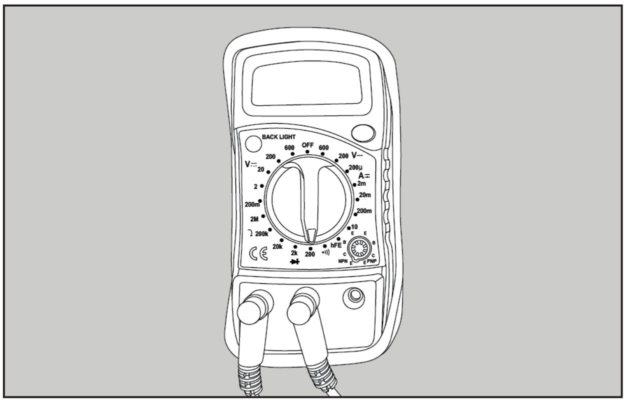
- Keep the positive probe of multimeter in socket 1 of the Sensor breakout box and negative probe in pin 2 of the Power relay and check for continuity.



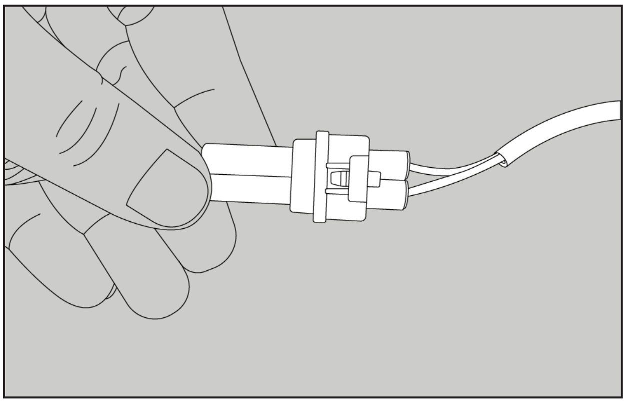


To Check the Resistance

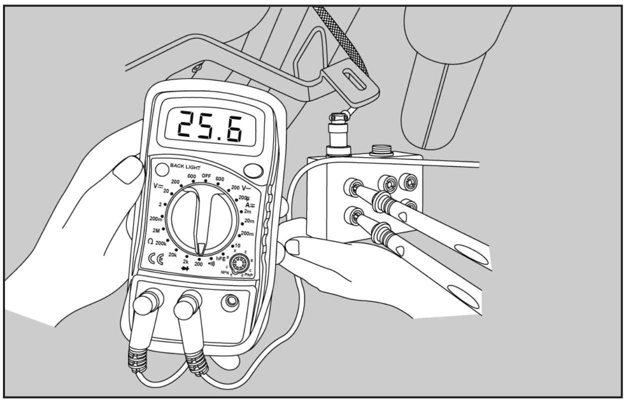
- Keep the multimeter in Resistance mode



- Connect the Canister purge solenoid breakout box harness to Canister purge solenoid coupler

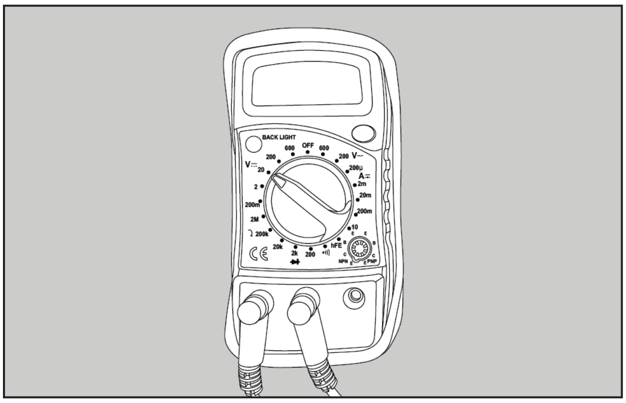


- To check the Resistance value of the Canister purge solenoid, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Canister purge valve breakout box. The resistance value is to be 24 to 28 Ohms @30+5°C.

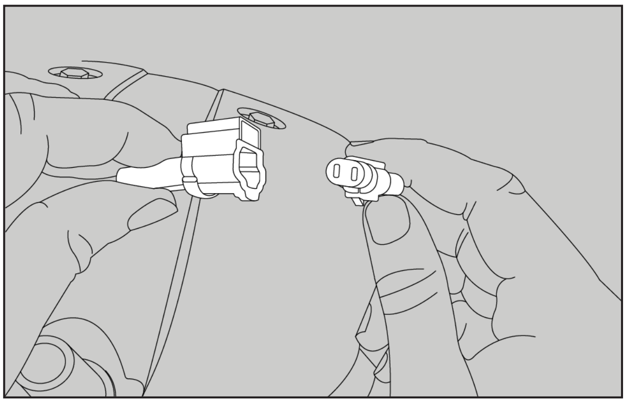


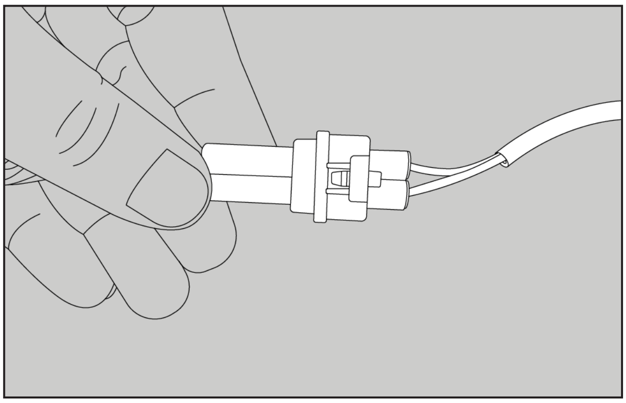
To Check the Input voltage

- Keep the multimeter in Voltage mode (20 V)

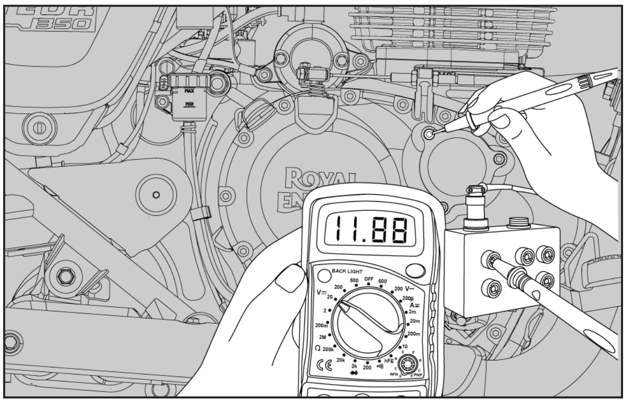


- Connect the canister purge breakout box wiring harness to Canister purge solenoid wiring harness coupler .





- To check voltage at the wiring kit end, place the positive probe of the multimeter in Socket 1 of the Sensor breakout box and place the negative of the multimeter to body ground. Turn "ON" the ignition and kill switch and you will be able to see the voltage of the battery and it should be 12 V in the multimeter.



d. DECISION POINT:

- If there is no continuity between ECU and canister purge valve you may replace the Wiring harness.
- If the resistance is not within the specified limit (24 to 28 Ohms), you replace with a Canister purge solenoid
- If the input voltage is meeting the specified limit, if continuity is available and resistance is reaching the specified limits, then you have to replace the ECU.

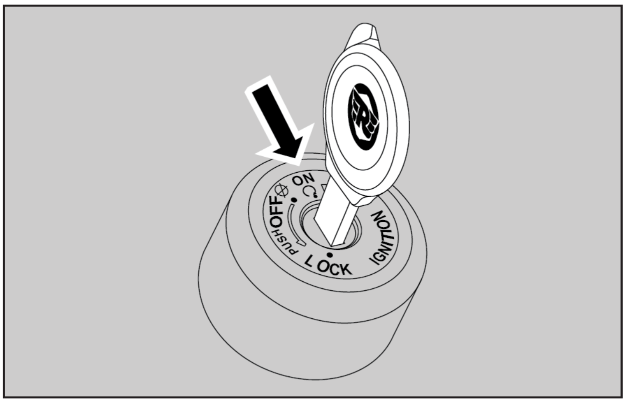
It is recommended to replace the canister purge solenoid /ECU / Wiring Harness as per the advice from Royal Enfield only

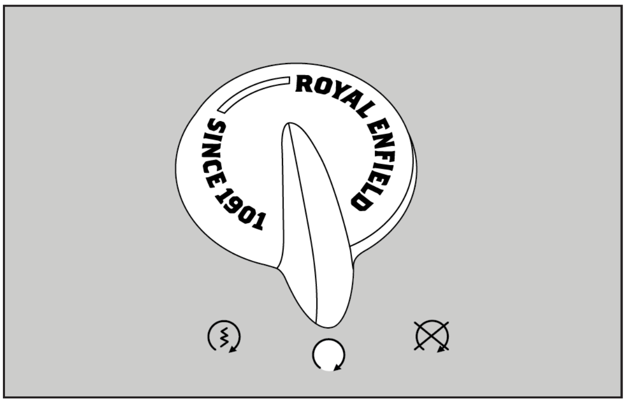
d. DECISION POINT:

⚠ CAUTION

With sensor connector disconnected and ignition is switched “ON”, DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in “ON” Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Switch “OFF” the ignition key and again switch “ON” - repeat this cycle for 3 times till the MIL is “OFF”
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

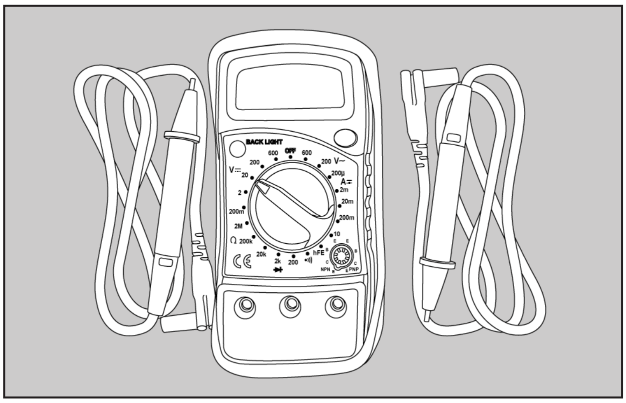
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition “ON” condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine etc which might result in short circuit**
- **Please ensure Ignition is turned “OFF” while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition “ON”**
- **With sensor connector disconnected and ignition is switched “ON”, DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting etc.**

Tools Required

- Multimeter (Universal)

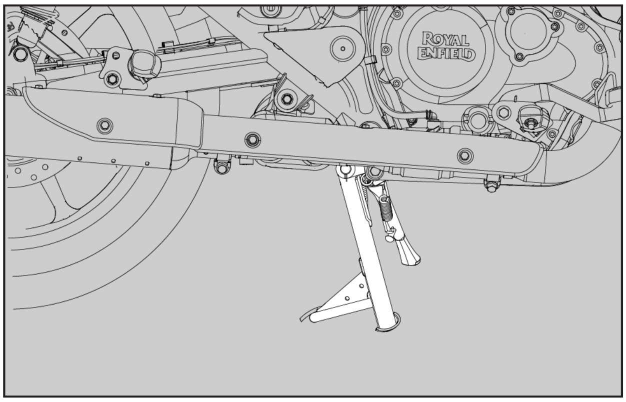

BACK LIGHT
OFF
600
600
200
200
V⎓
V~
20
2
200m
2M
Ω 200k
20k
2k
200
hFE
200µ
A⎓
2m
20m
200m
10
E
B
C
NPN
PNP

- Probe/Test lead wire(110 SERIES - Black Color wire)
- Probe/Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler

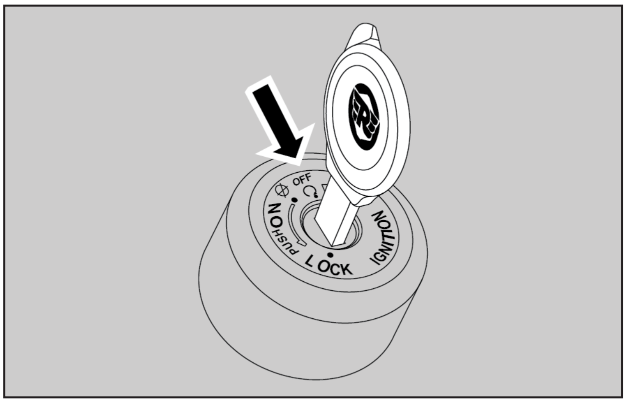
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

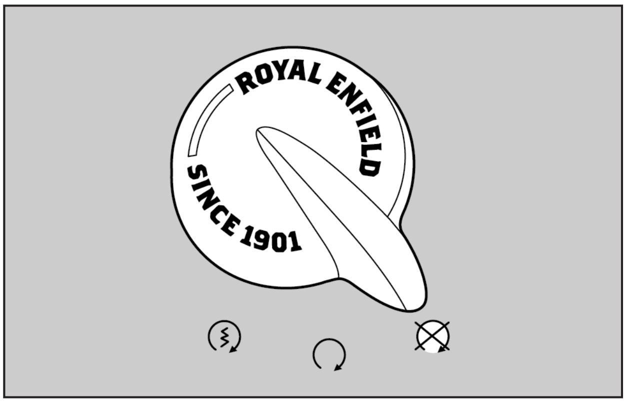
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

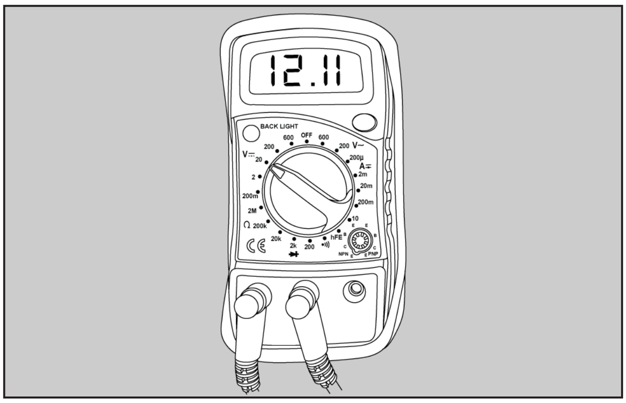


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

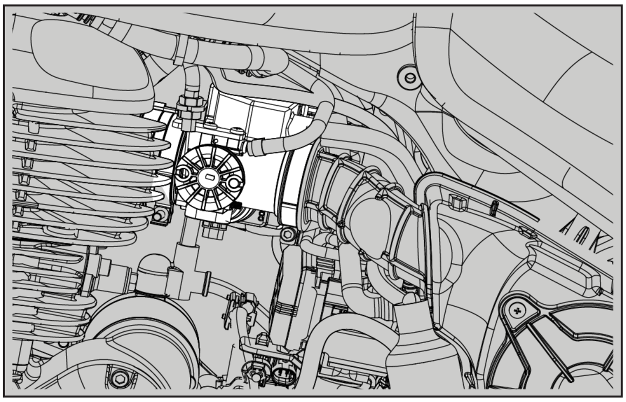
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

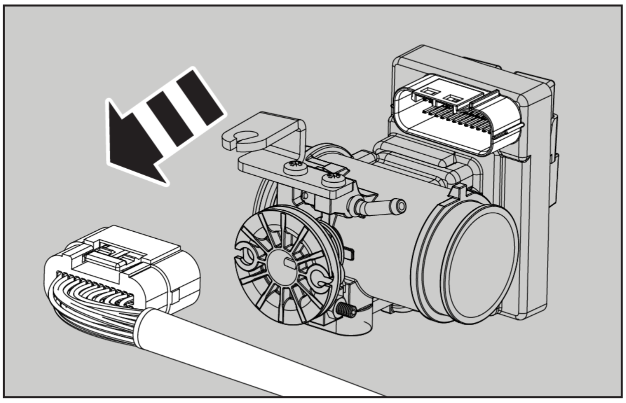
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

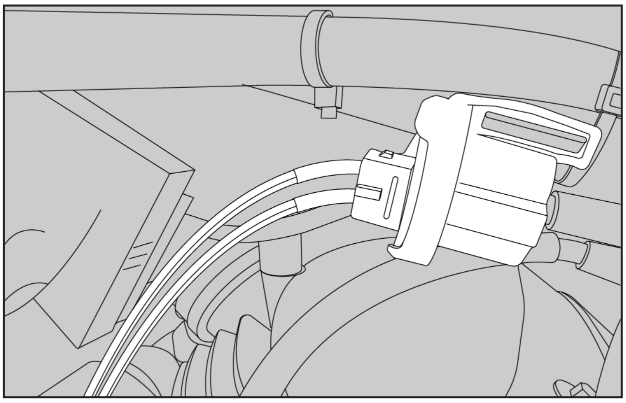
- ECU is located on the throttle body assembly



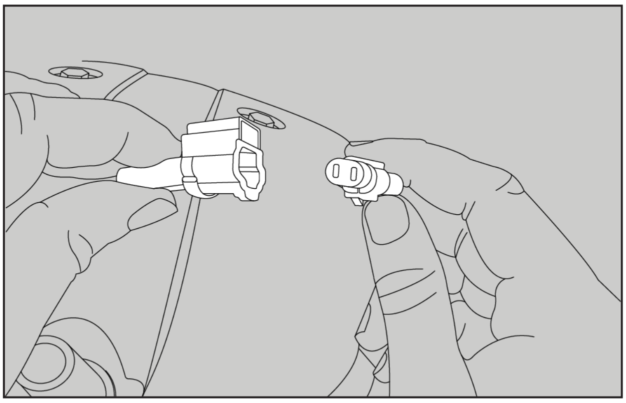
- Disconnect ECU from ECU wiring harness coupler



- Canister purge solenoid is located on the frame below the fuel tank



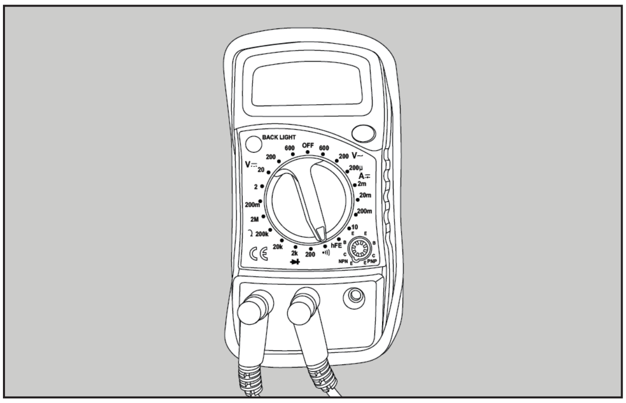
- Disconnect Canister purge solenoid coupler.



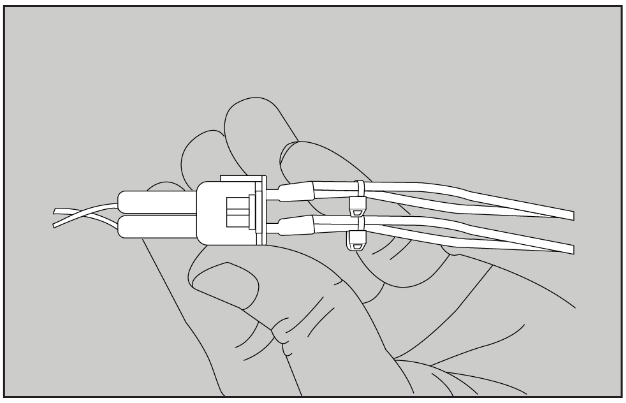
To check the Continuity of the wiring harness

STEP 1

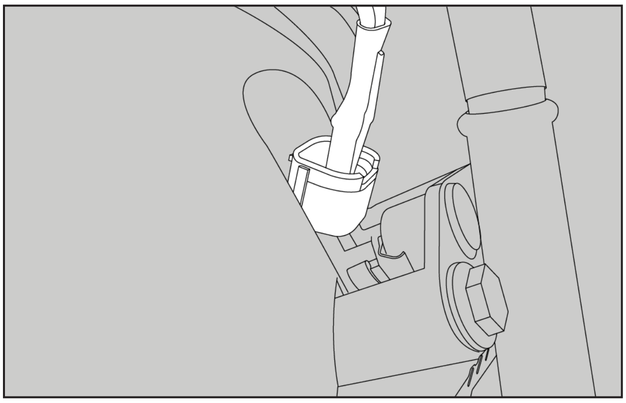
- Keep the multimeter in continuity mode.



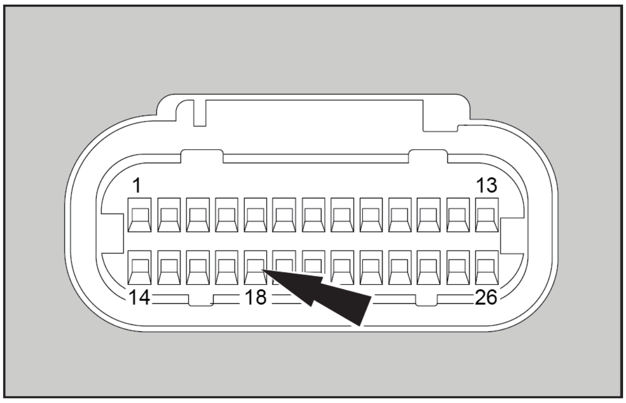
- Connect the Test lead wires 110 series Black colour in the Canister purge solenoid wiring harness coupler.
- 110 series (Black color) test lead wire with black tag in Pin 1 of canister purge solenoid wiring harness coupler
- 110 series (Black color) test lead wire with red tag in Pin 1 of canister purge solenoid wiring harness coupler



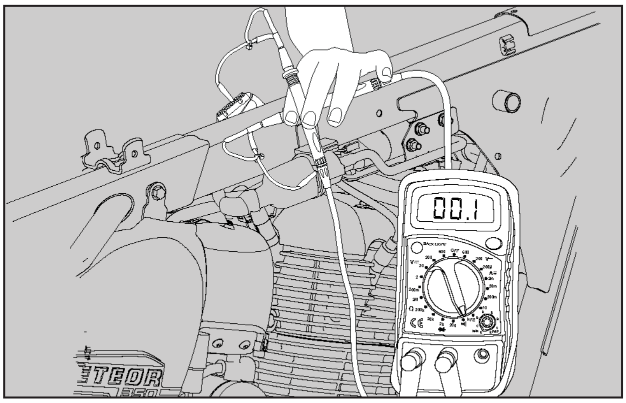
- Keep the multimeter positive probe to Pin 2 (test lead wire with red tag) of the Canister purge solenoid wiring harness coupler .



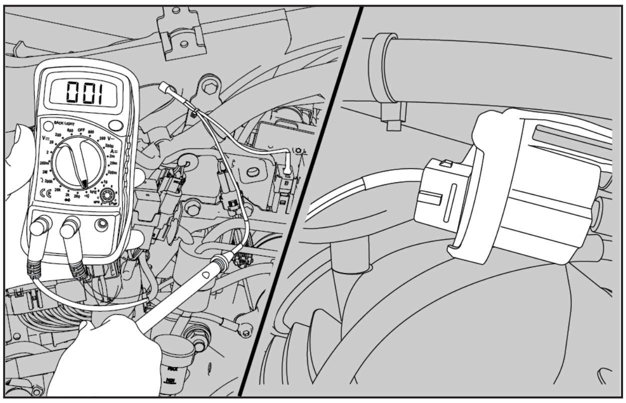
- Connect 40 series (yellow color) test lead wire with black tag to pin 18 of the ECU wiring harness coupler.



- To check continuity, keep the positive probe of the multimeter in pin 2 of the Canister purge valve and negative probe in socket 18 of ECU socket.Check for continuity (Beep sound from multimeter)

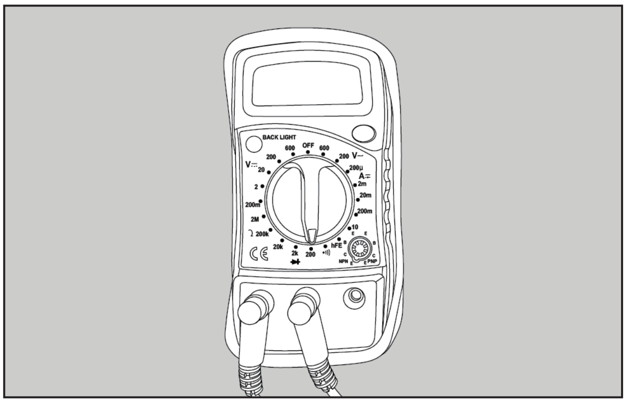


- To check continuity, keep the positive probe of the multimeter in pin 1 of the canister purge solenoid and pin 2 of the Power relay (contact output).Check for continuity (Beep sound from multimeter)



To check the Resistance

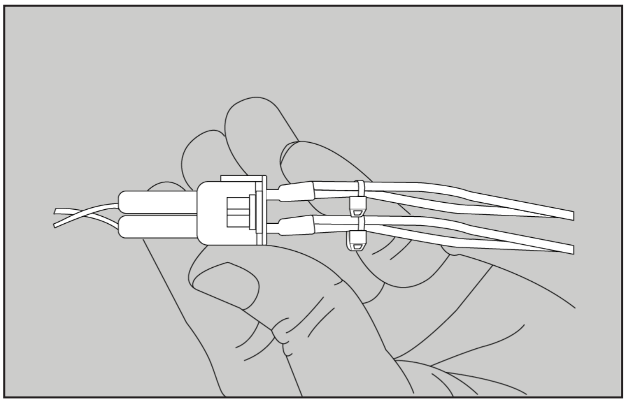
- Keep the multimeter in Resistance mode



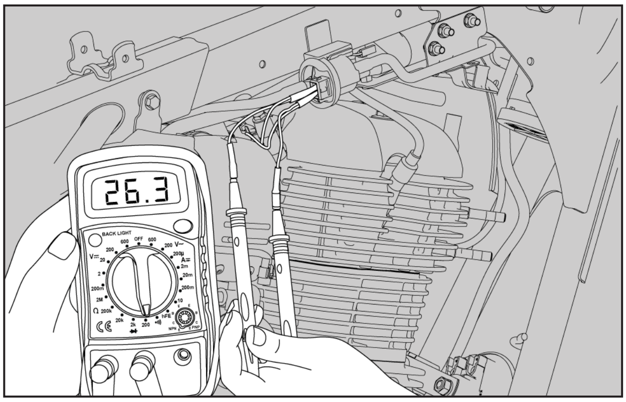
- Connect the Test lead wires 110 series black colour in the canister purge valve coupler.

110 series (black color) Test lead wire with black tag in Pin 1 of Canister purge solenoid coupler

110 series (black color) Test lead wire with red tag in Pin 2 of Canister purge solenoid coupler

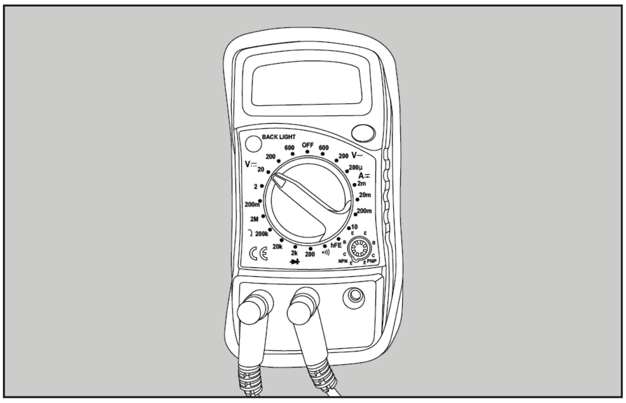


- Keep the multimeter positive probe in Pin 1 (Test lead wire with Black tag) and negative probe in Pin 2 (Test lead wire with red probe). Resistance value to be 24.2 to 27.8 Ohms @ 30 5 °C.

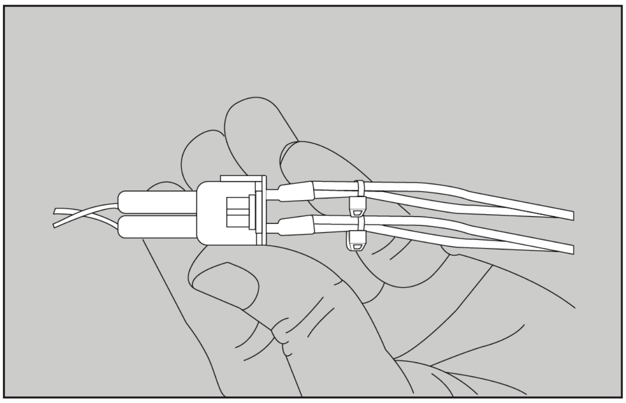


To check the Input voltage

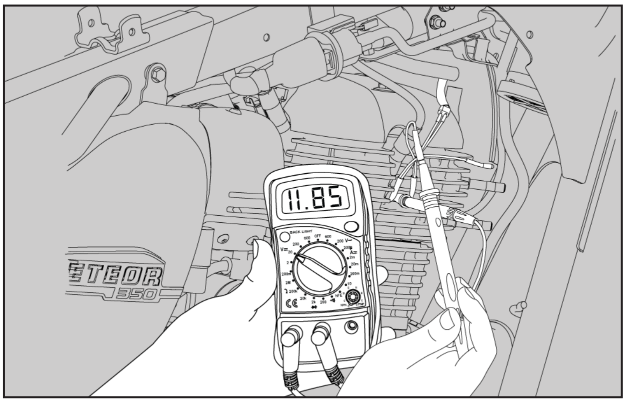
- Keep the multimeter in voltage mode



- Connect the Test lead wires 110 series (black color) in the Secondary air valve wiring harness coupler.
- 110 series (black color) Test lead wire black tag in Pin 1 of secondary air valve wiring harness coupler
- 110 series (black color) test lead wire red tag in Pin 2 of secondary air valve wiring harness coupler



- Connect the multimeter positive probe to pin 1(110 series Test lead wire black colour with Black tag) and negative to body ground in the wiring harness coupler and turn “ON” the ignition and kill switch. The voltage should be equal as the battery voltage (12 V).



d. Decision Point:

- if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (24.2 to 27.8 Ohms @ 30 5 °C), you replace with Secondary air valve
- If the voltage is meeting the specified limit and if continuity is available you have to replace the ECU.

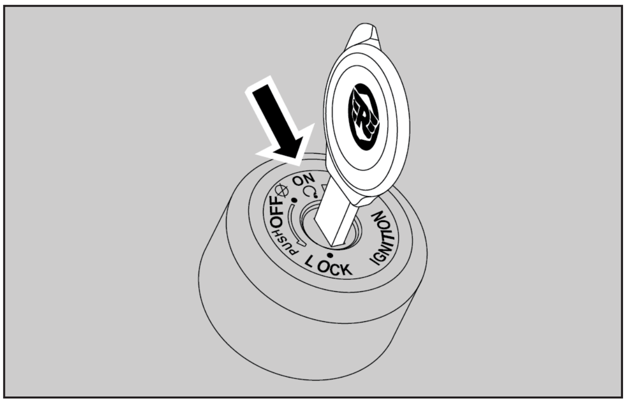
It is recommended to replace the secondary Air Valve /ECU / Wiring Harness as per the advice from Royal Enfield only

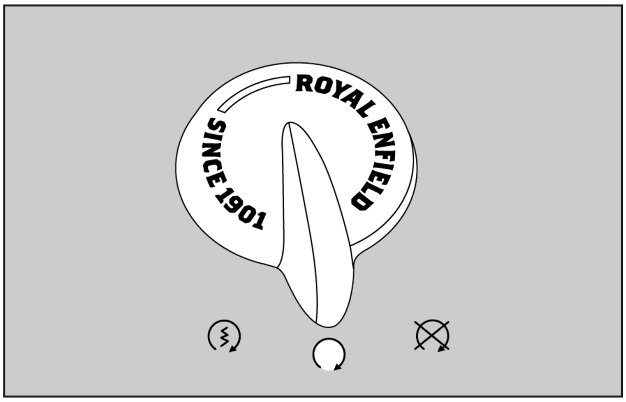
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P 0650 -MIL DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	~~Error Description as per DOL~~
1	P0650	MIL	MIL circuit malfunction

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Malfunction indicator lamp (MIL) is also called as Check engine light
TROUBLE CODE : DTC CODE: P0650

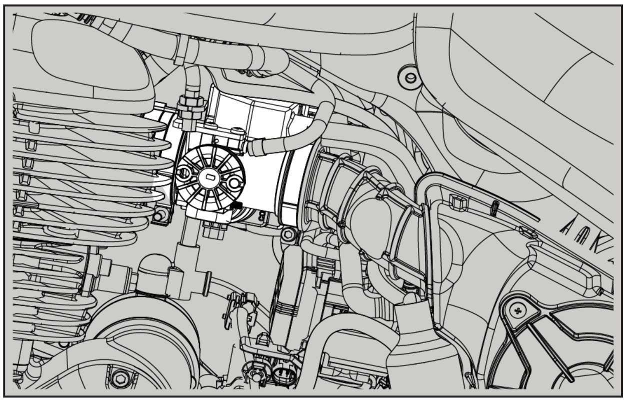
Type of error : MIL circuit malfunction

(i) Information : Engine oil temperature sensor circuit fault / Engine oil temperature sensor internal fault

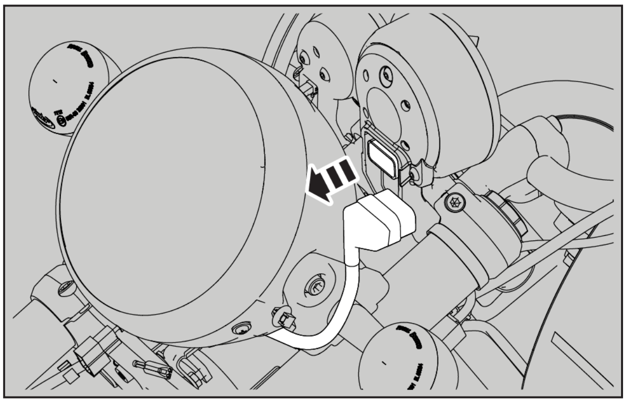
b.Preliminary Checks (Basic Check Points):

⚠ **CAUTION**
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

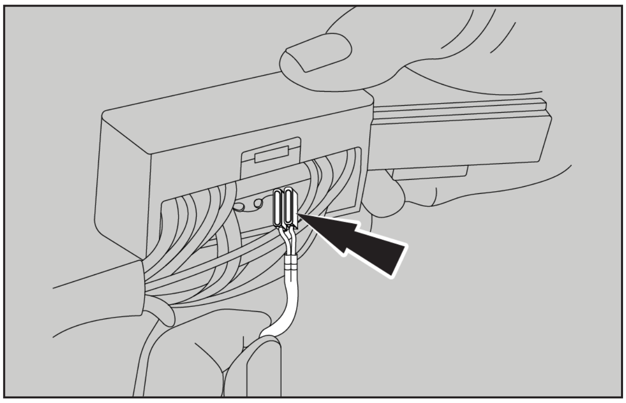
- ECU coupler is located in the Throttle body Assembly



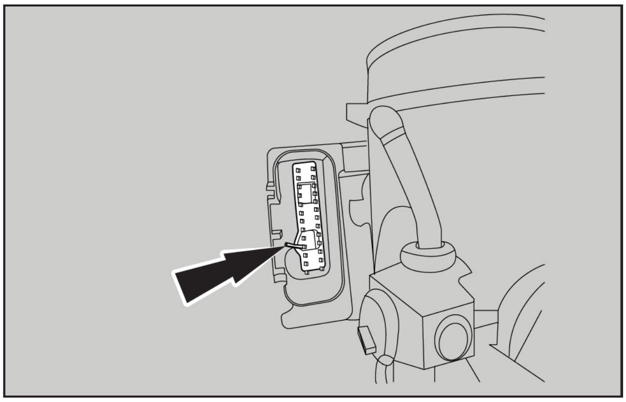
- MIL is located in the instrument Cluster unit



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and MIL (Instrument Cluster) couplers, if found change the MIL (Instrument Cluster) unit or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part**.**

It is recommended to replace the Instrument Cluster / ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

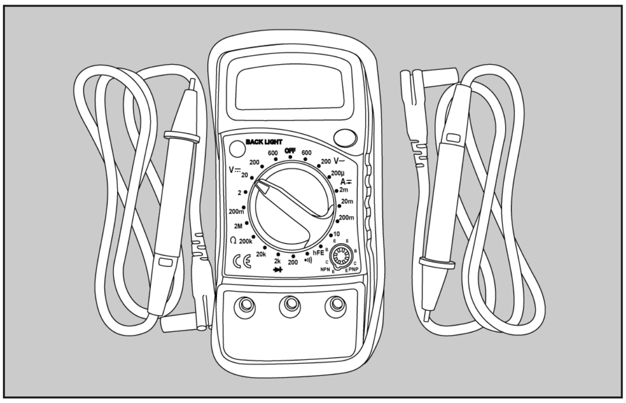
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

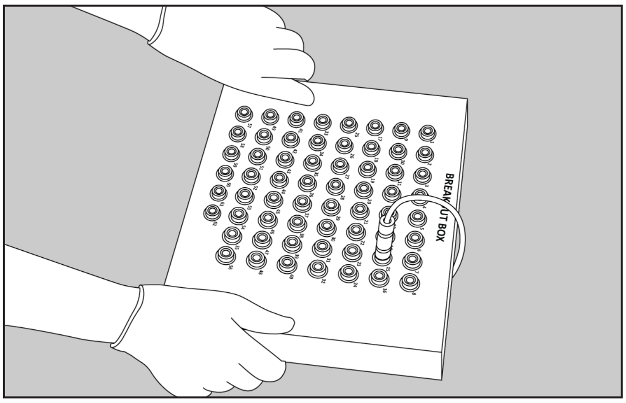
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

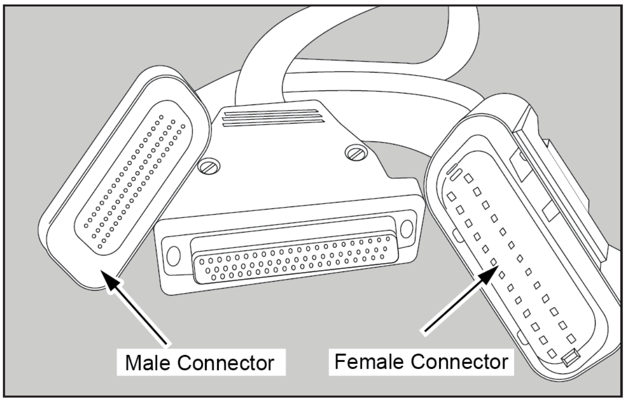
- **Tools Required**
- Multimeter (Universal)



- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

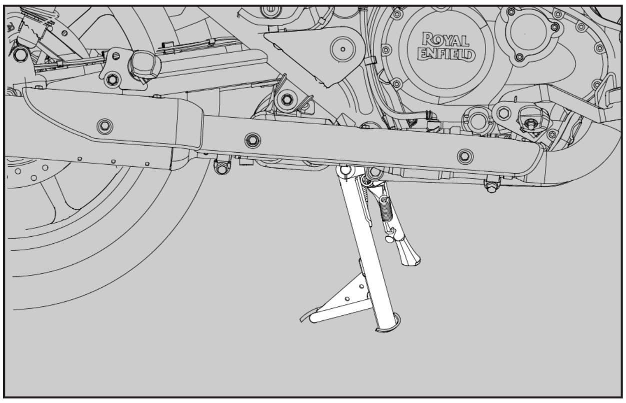


- 26 pin ECU Breakout Harness -ST ST30923/A

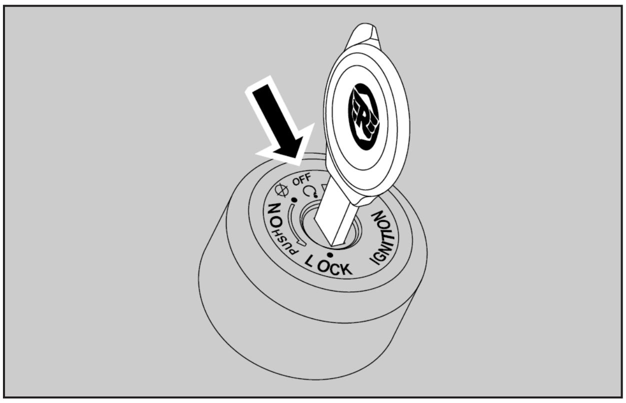

Male Connector
Female Connector

b. Pre-Checks:

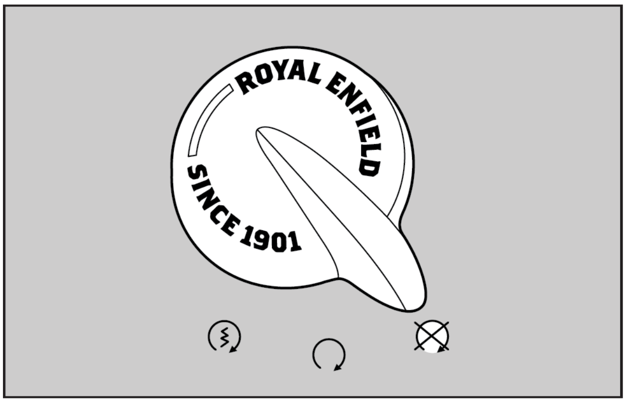
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

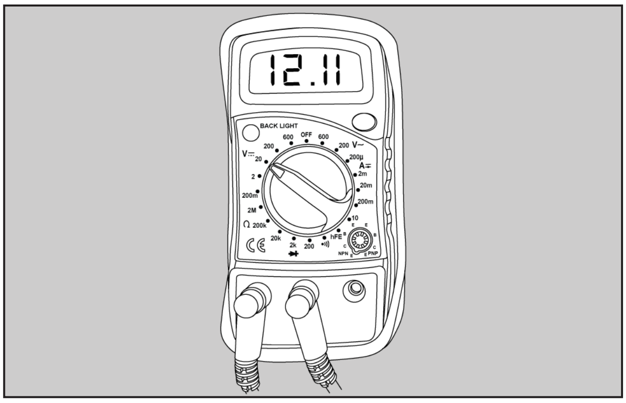

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

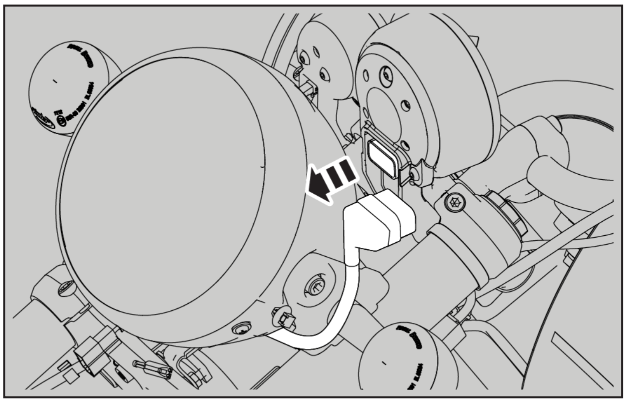
NOTE

- *Please remove headlamp assembly and wiring harness related to headlamp assembly to access the instrument cluster*

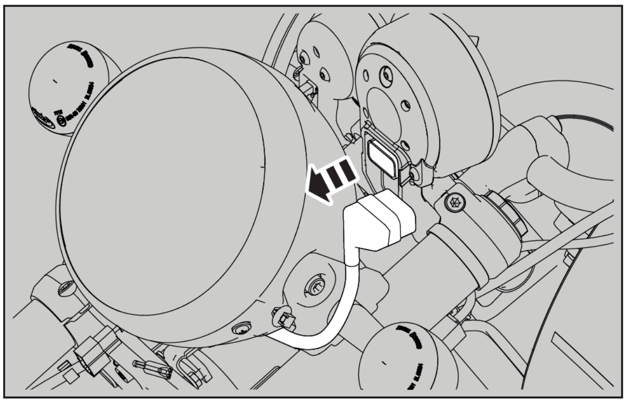
NOTE

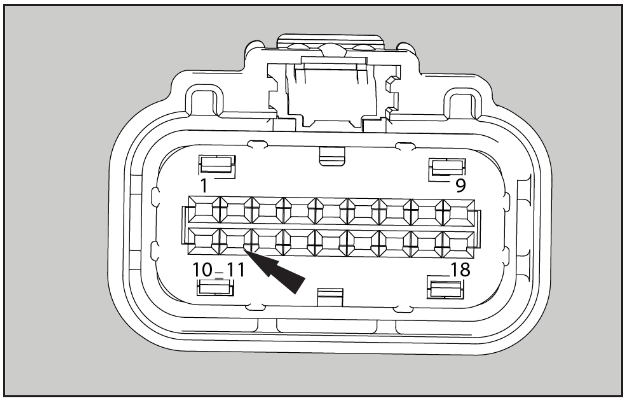
- *Removal & refitment of headlamp assembly is mentioned in the service manual (exclusive hyperlink here)*

- MIL is located on the instrumental cluster

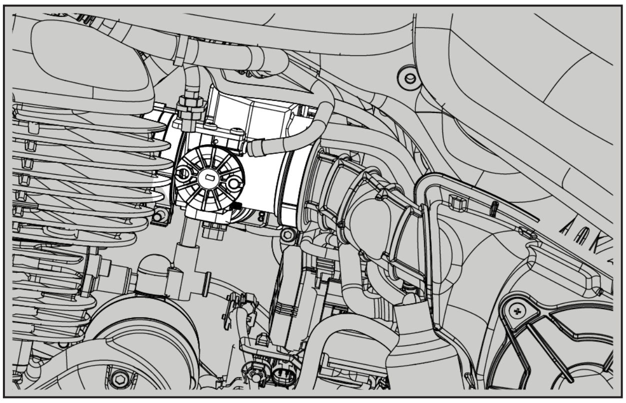


- Disconnect the instrument cluster coupler

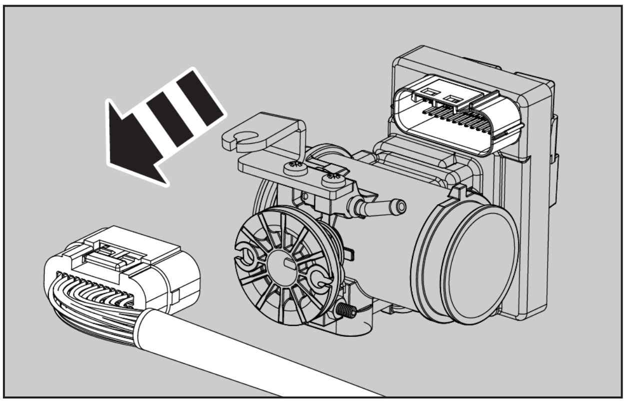




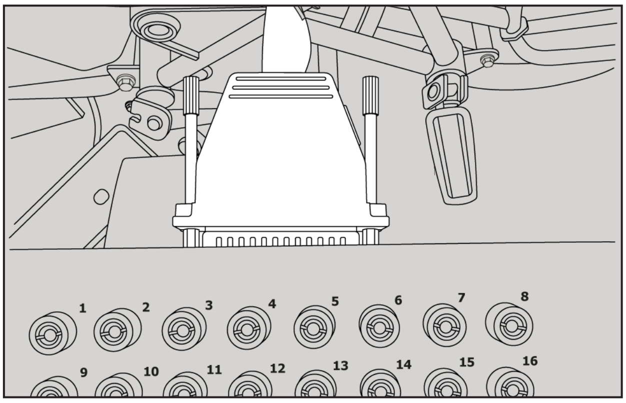
- ECU is located on the throttle body.



- Disconnect the ECU wiring harness coupler from ECU



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness


1
2
3
4
5
6
7
8
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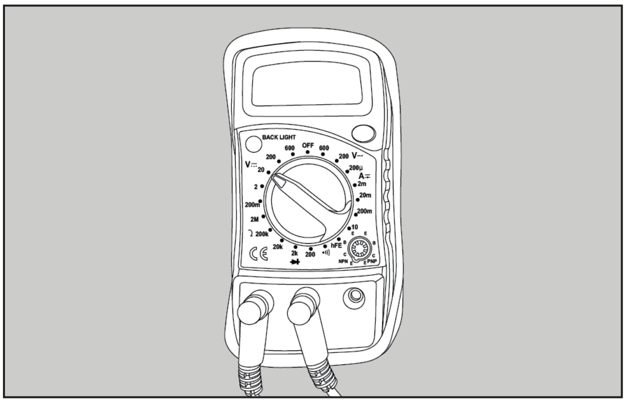
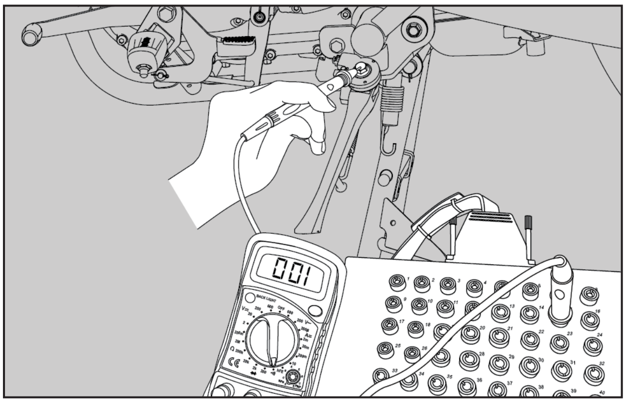
11
12
13
14
15
16

a. Input voltage check

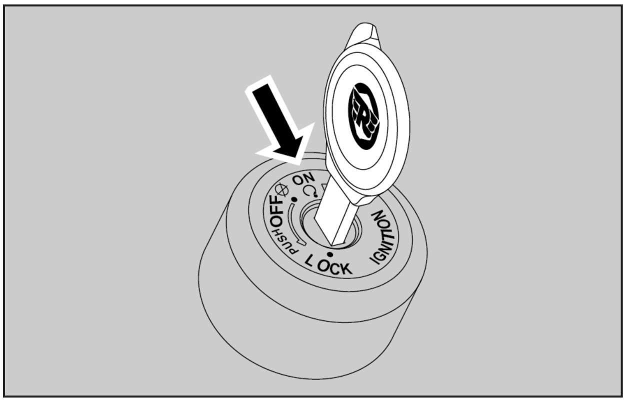
- Keep the multimeter in voltage mode (20 V)

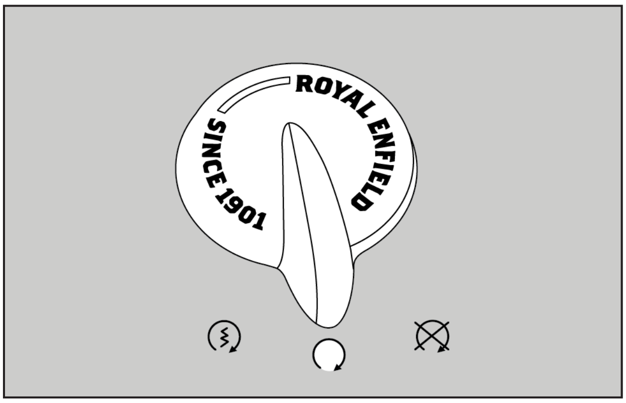

BACK LIGHT
OFF

- Check the voltage across socket 15 of the ECU breakout box and place the negative probe of the Multimeter to body ground or Battery Negative or socket 1 of the ECU breakout box

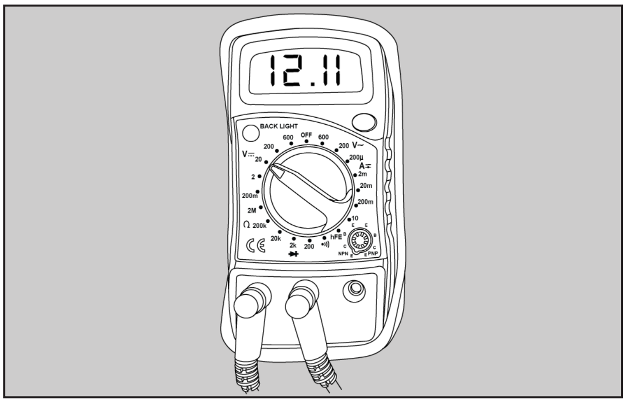


- Turn "ON" the Ignition switch & Kill switch in 'OFF'


ON
OFF
PUSH
LOCK
IGNITION

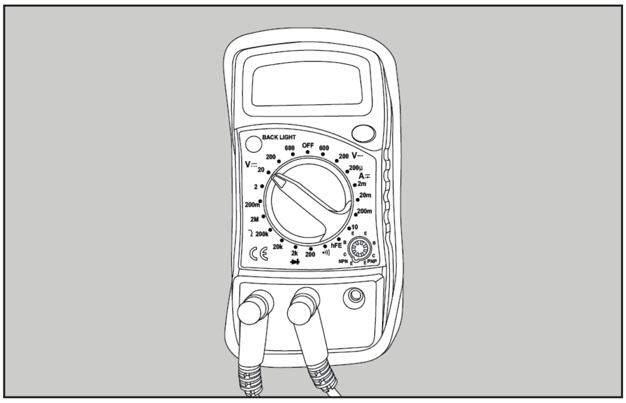

ROYAL ENFIELD
SINCE 1901

- Check for 12V supply in Multimeter when MIL is 'OFF'

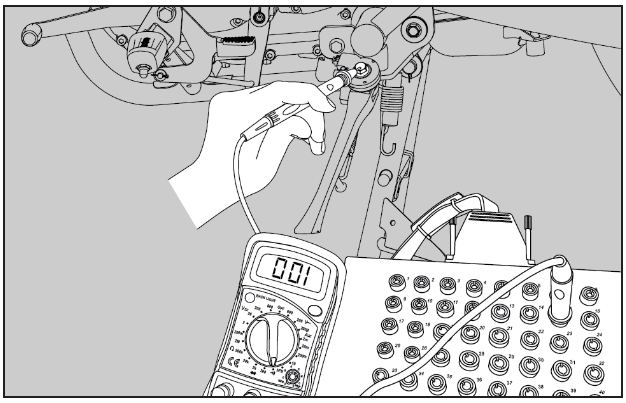


b. To check the System Voltage:

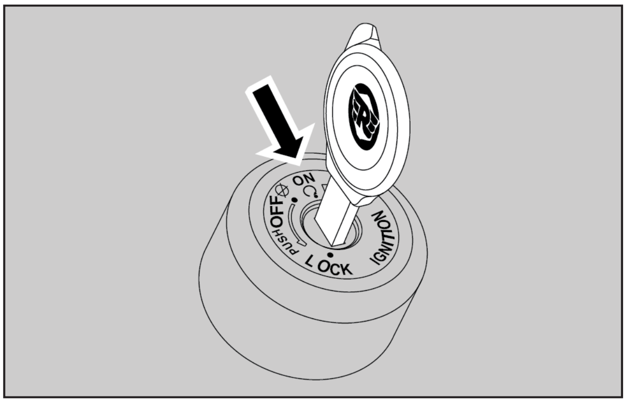
- Keep the Multimeter in Voltage mode (20 V)

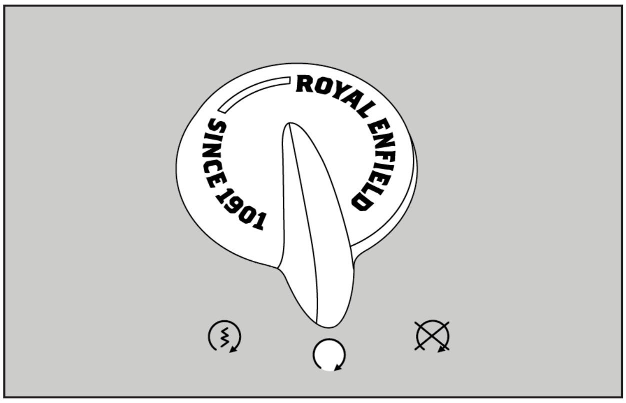


- Check the voltage across socket 15 of the ECU breakout box and place the negative probe of the Multimeter to body ground or Battery Negative or socket 1 of the ECU breakout box



- Ensure Ignition & Kill Switch is in "ON" Position





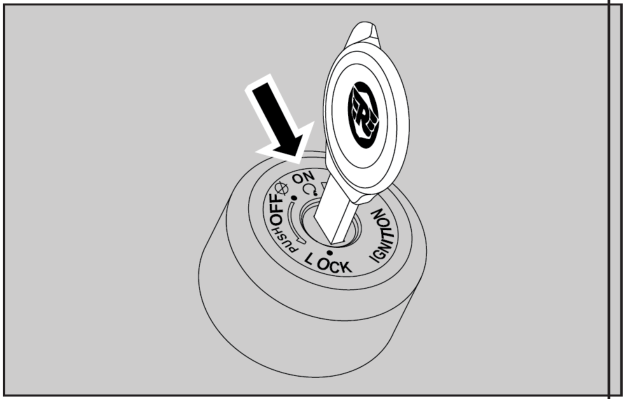
d.Decision point

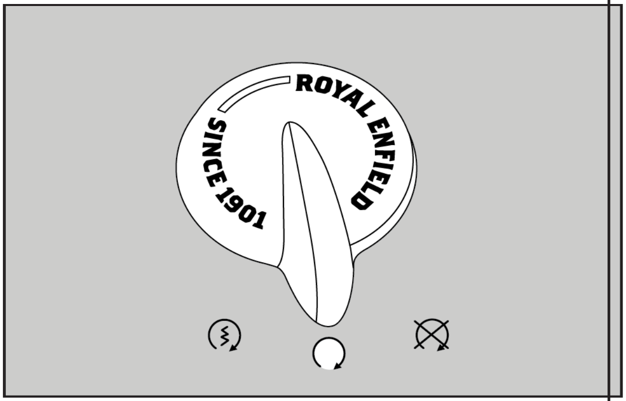
- During the Ignition switch "ON" and Kill switch "OFF" condition if 12V is not observed, you may check the Instrument Cluster and replace the wiring harness.)
- During Ignition switch "ON" and Kill switch "ON" condition if 12V is observed, you may check and replace the ECU

It is recommended to replace the Instrument Cluster / ECU / Wiring Harness as per the advice from Royal Enfield only

4. DTC Clearing Procedure:

- Ensure Ignition & Kill Switch is in “ON” Position.





If the fault is rectified, Click on Erase DTC Icon

Click yes to confirm to erase DTC’s

Now it will appear as “NO DTC’s”, hence all the error logs cleared.

Switch “OFF” the ignition key and again switch “ON” - repeat this cycle for 3 times till the MIL is “OFF”

Start the Engine to know the MIL condition

Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

3.2 Test lead wire METHOD :

⚠ WARNING

Do not disconnect and connect any sensor or ECU with ignition “ON” condition

Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.

Test lead wire is used/inserted as per the recommendation while doing diagnosis/measurements. If the wrong test lead probes are inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.

Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms

To be used only while diagnosis only to avoid short between pins or any extended leads which are not connected

Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit

Please ensure Ignition is turned “OFF” while connecting and removal of test kit to avoid any creation of fluctuation in voltage

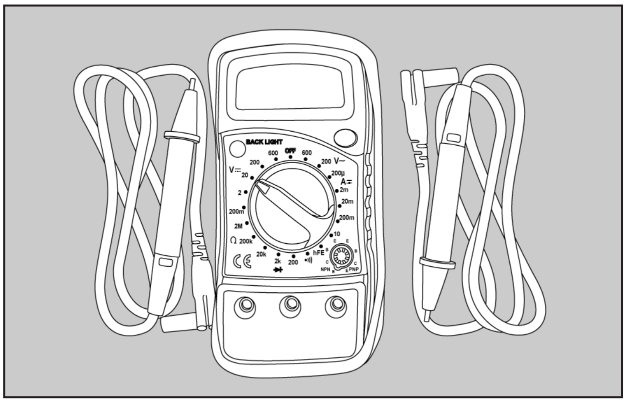
Do not disconnect and connect any sensor or ECU with ignition “ON”

With sensor connector disconnected and ignition is switched “ON”, DTC will occur and neet to follow the DTC clearing procedure after reconnecting

Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting, etc

a.Tools Required

- Multimeter (Universal)

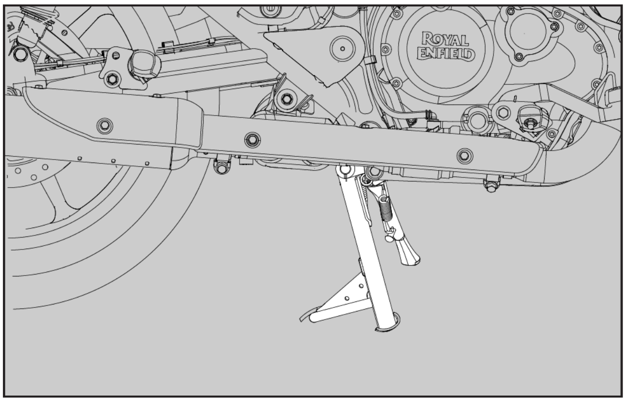


- Probe/Test lead wire (25 SERIES - Grey Color Wire)
- Probe/Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - hyperlink for the table will be given here

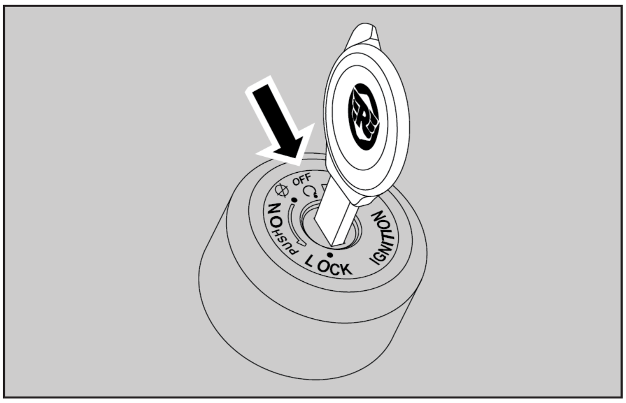
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

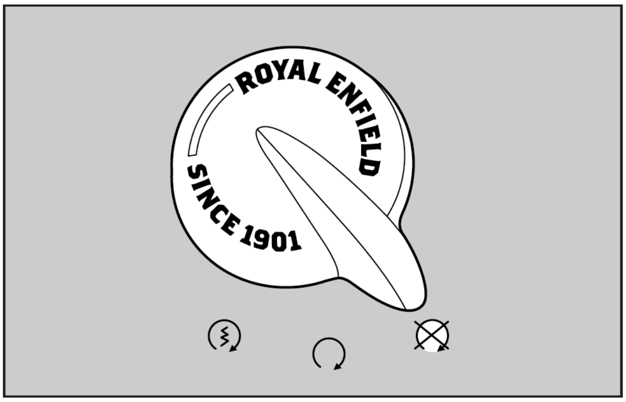
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

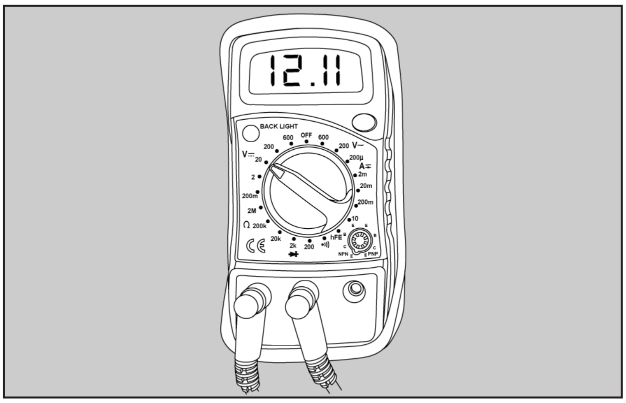


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ CAUTION

Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers

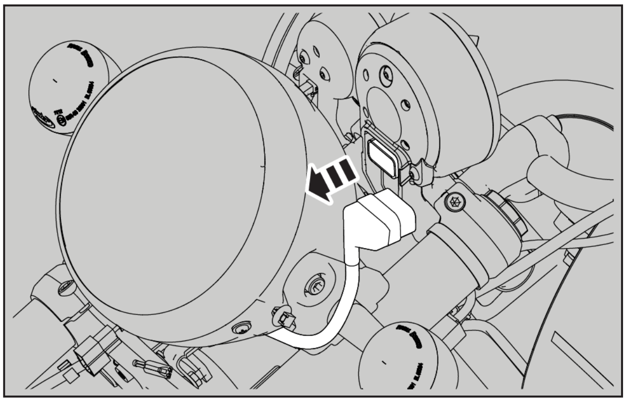
NOTE

- *Please remove headlamp assembly and wiring harness related to headlamp assembly to access the instrument cluster*

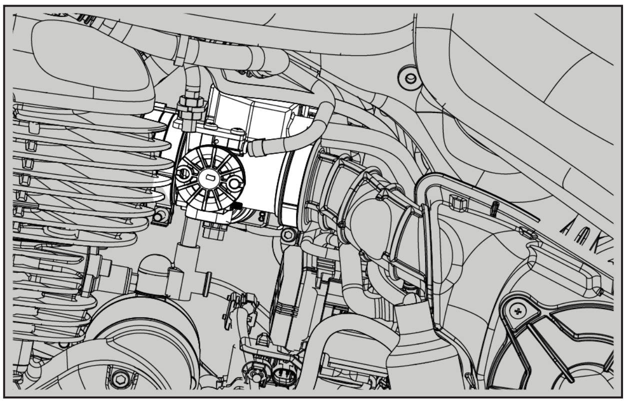
NOTE

- *Removal & refitment of headlamp assembly is mentioned in the service manual (exclusive hyperlink here)*

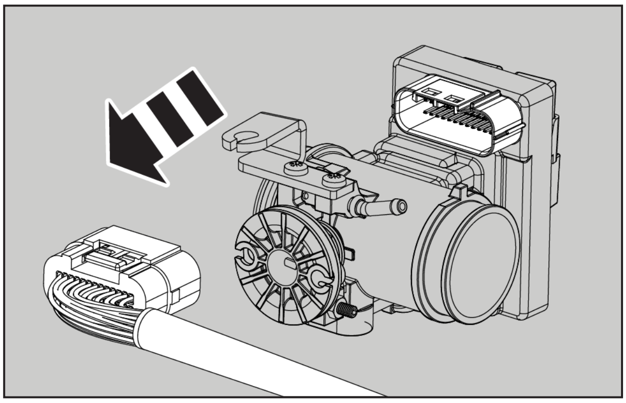
- Disconnect the instrument cluster coupler



- ECU is located on the throttle body



- Disconnect the ECU wiring harness coupler from ECU

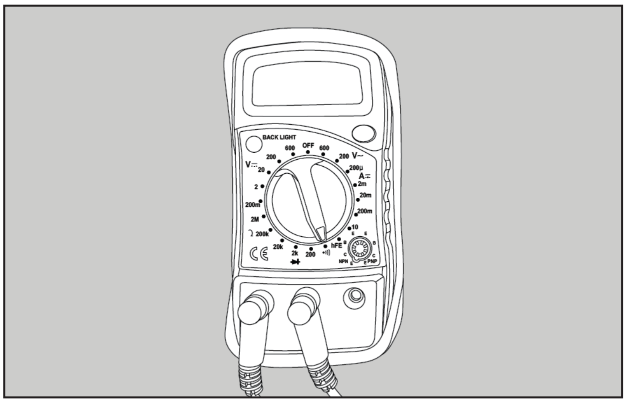


- Connect the test wire lead in the instrument cluster socket

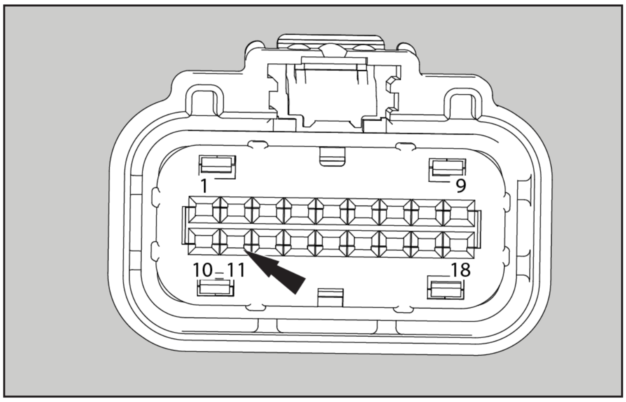
To check the continuity

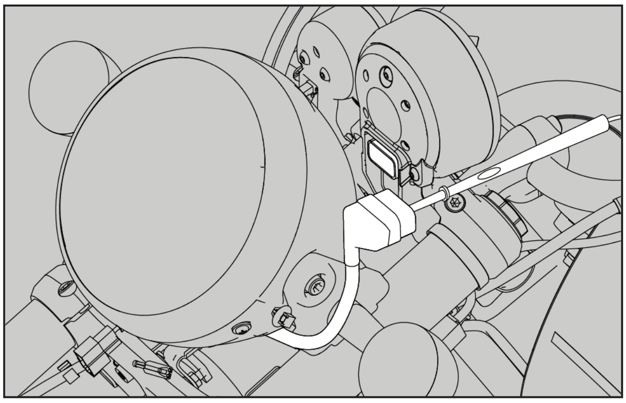
STEP 1:

- Keep the multimeter in continuity mode

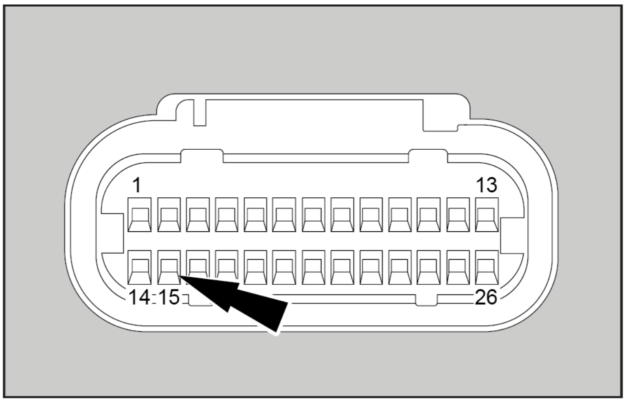


- Connect the test lead wire 25 series (grey color) with the black tag on instrument cluster pin 11..



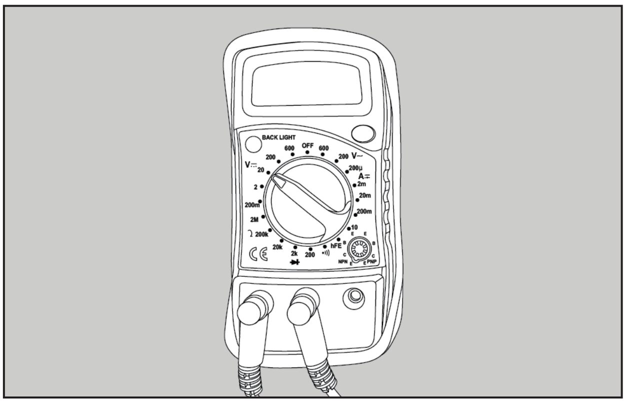


- Connect the test lead wire 40 series (yellow color) with the black tag to ECU wiring harness coupler pin 15. Check for continuity (Beep sound from multimeter).

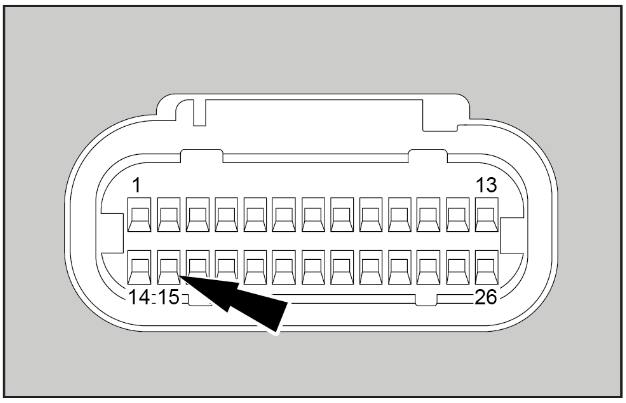


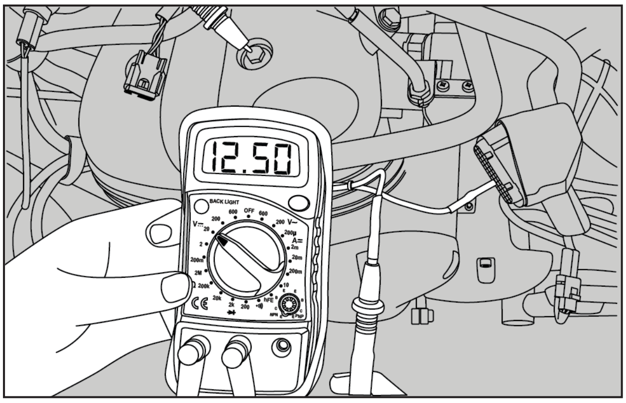
To check Input voltage

- Keep the Multimeter in Voltage mode (20 V)

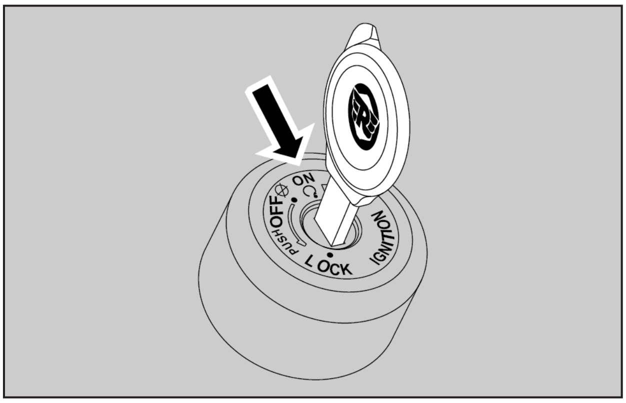


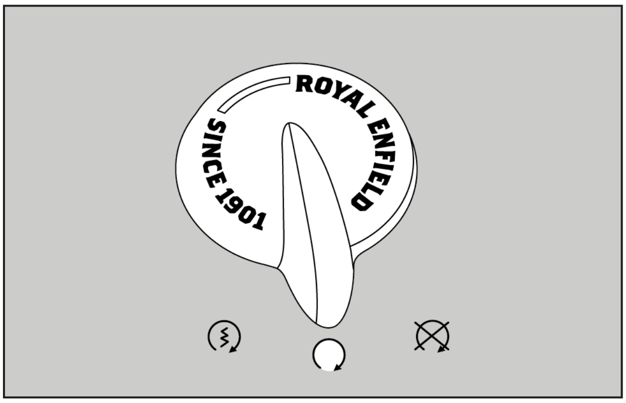
- Check the voltage across socket 15 of the ECU and place the negative probe of the Multimeter to body ground or Battery Negative.



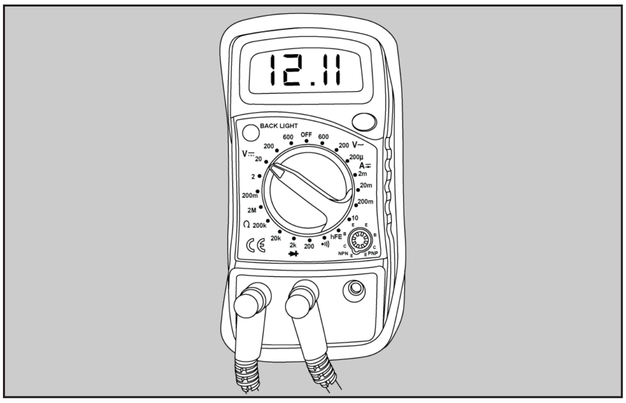


- Turn "ON" the Ignition switch, and Ensure that Kill switch is turned "OFF


ON
PUSH OFF
LOCK
IGNITION

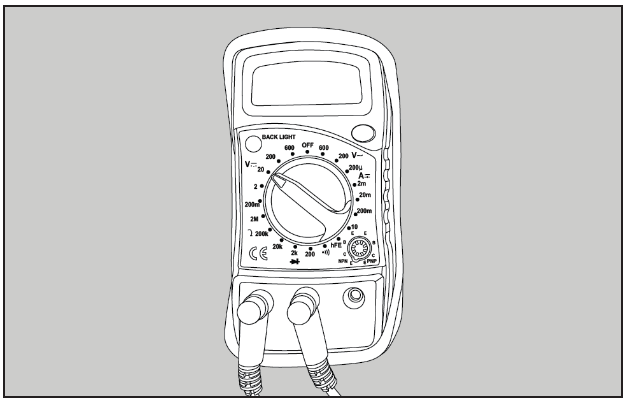

ROYAL ENFIELD
SINCE 1901

- Check for 12V supply in Multimeter when MIL light is 'OFF'

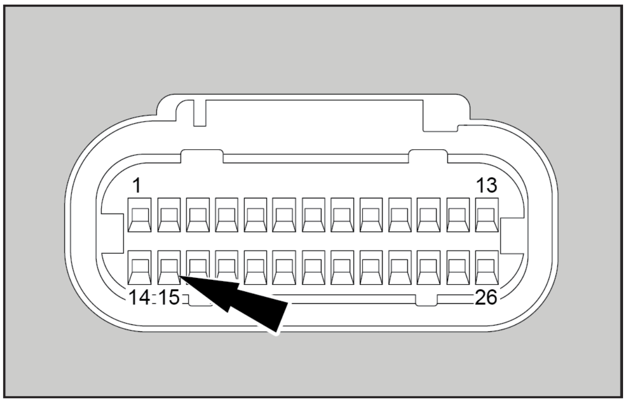


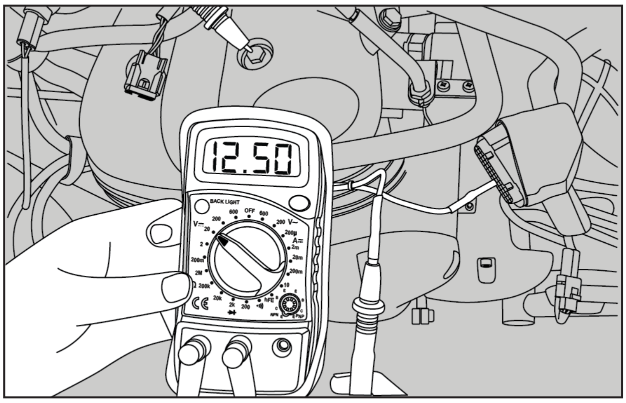
To check the System Voltage:

- Keep the Multimeter in Voltage mode (20 V)

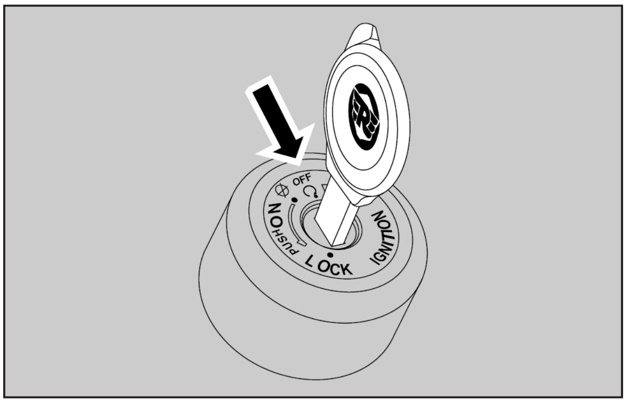


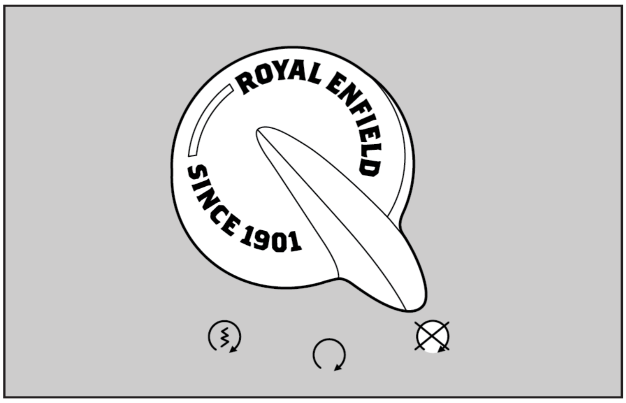
- Check the voltage across socket 15 of the ECU and place the negative probe of the Multimeter to body ground or Battery Negative





- Turn the Ignition switch, Kill switch into "ON" Position





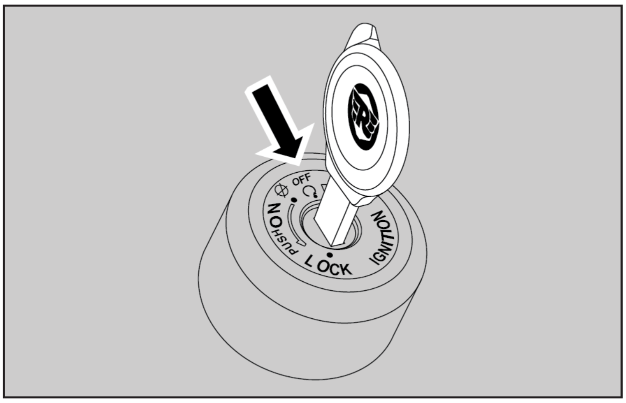
- Check for 0V in multimeter when MIL is 'ON'
- Start the engine and check for MIL 'OFF'(if no DTC error) and 12V in multimeter.

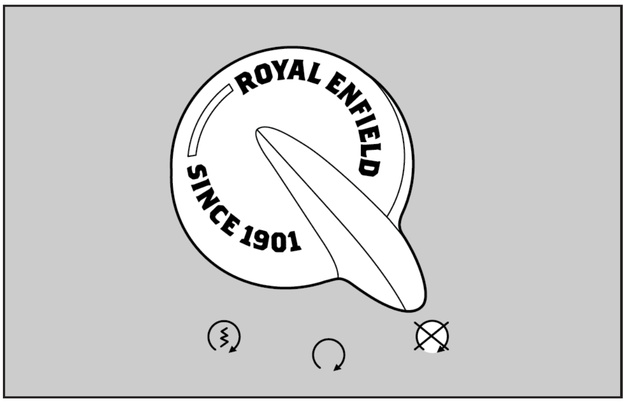
d. Decision Point:

- During Ignition switch "ON" and Kill switch "OFF" condition if 12V is not observed, you may check the Instrument Cluster and replace the wiring harness.
- During Ignition switch "ON" and Kill switch "ON" condition if 12V is observed, you may check and replace the ECU
- It is recommended to replace the Instrument Cluster / ECU / Wiring Harness as per the advice from Royal Enfield only

4. DTC Clearing Procedure:

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P1638 - HEAD LAMP CONTROL

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1638	Head Lamp Control	Head Lamp Control Circuit Low / Open

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE: DTC CODE: P1638

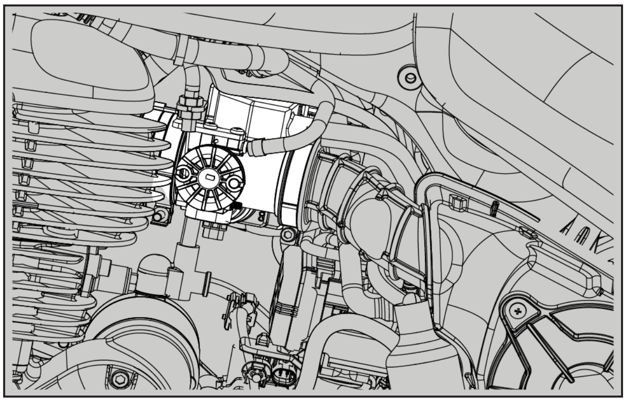
Type of error : Head Lamp Control Circuit Low / Open

(i) Information : Head Lamp Control circuit fault / Head Lamp Control relay fault

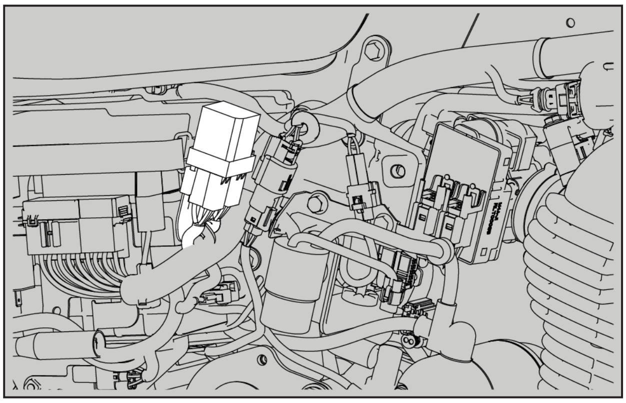
b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

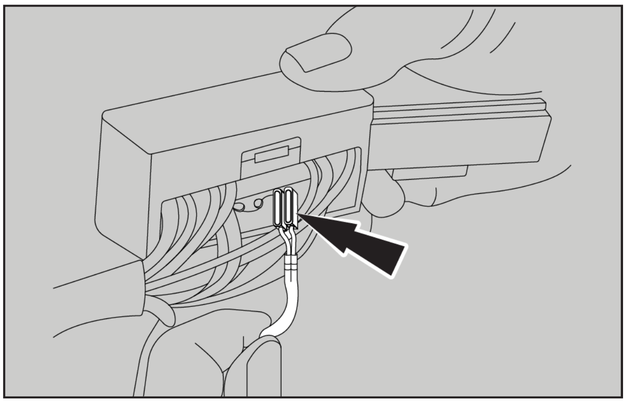
- ECU is located on the throttle body assembly



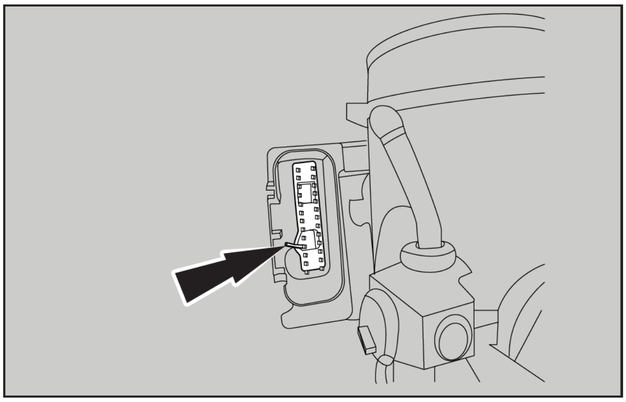
- Auto headlamp relay is located on Right side panel



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part

It is recommended to replace the ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

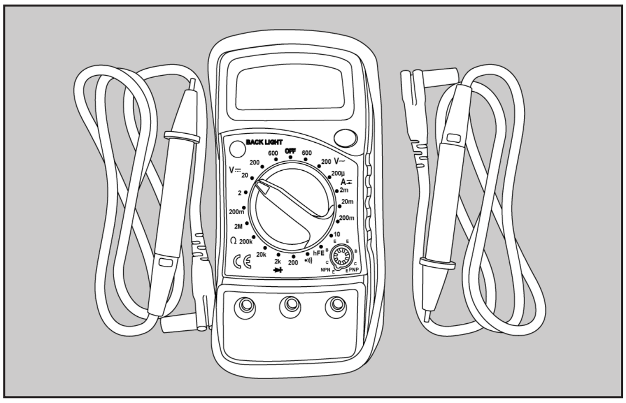
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

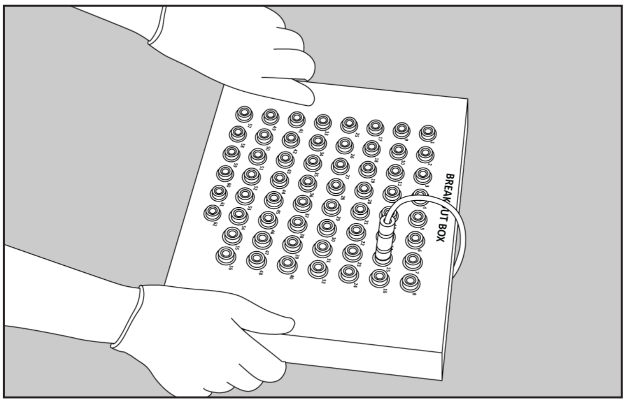
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)

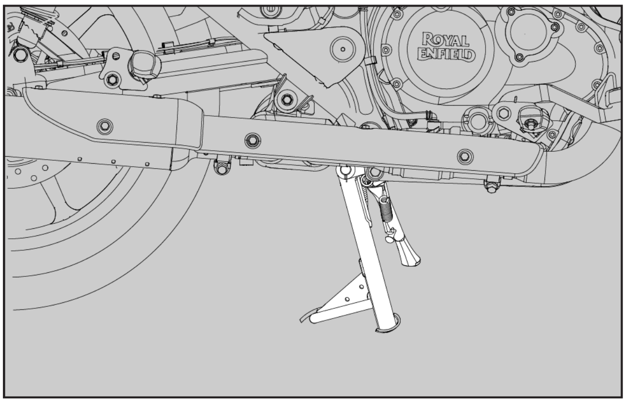


- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

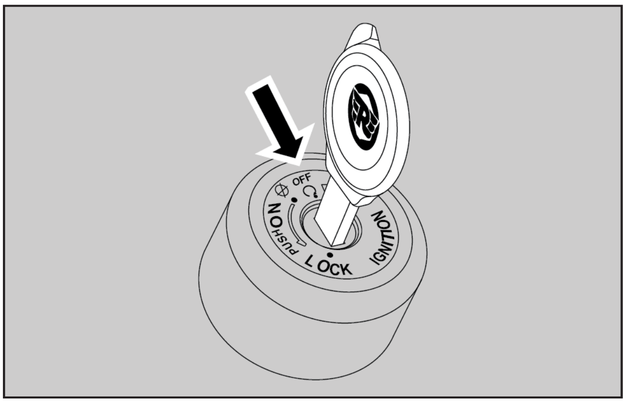


b. Pre-Checks:

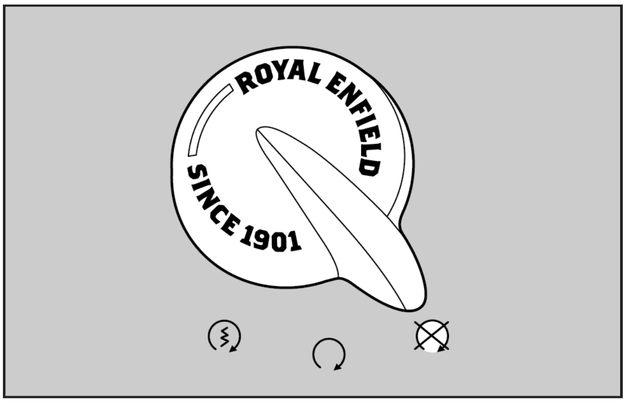
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

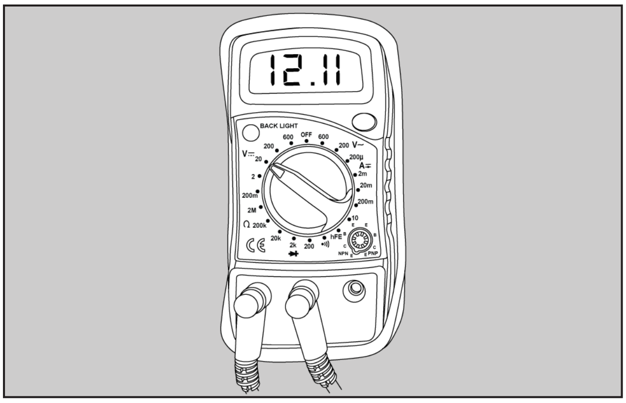


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition “ON” condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

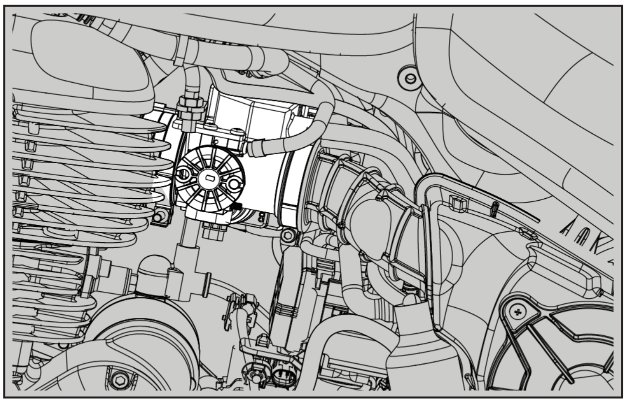
NOTE

- *Please remove the right-side panel from the motorcycle to access headlamp relay*

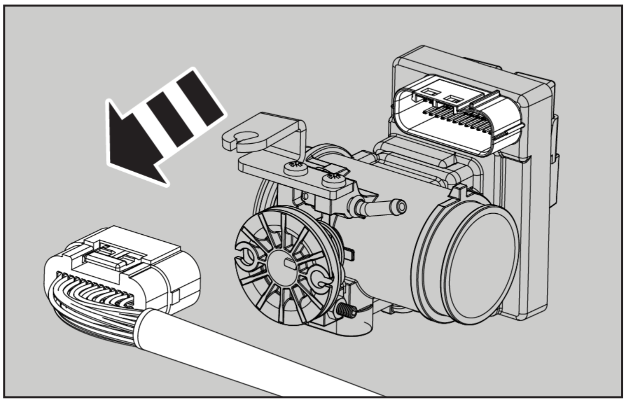
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

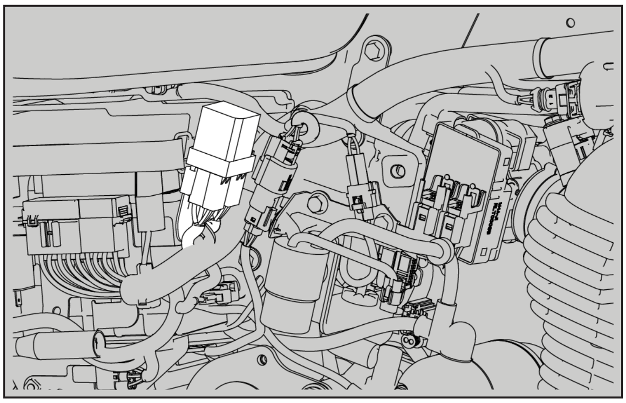
- ECU is located in the throttle body assembly



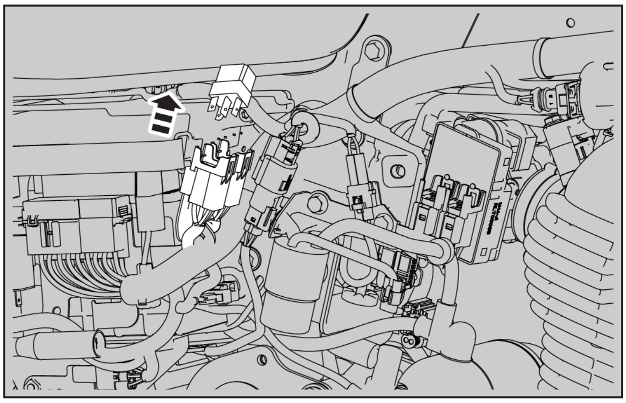
- Disconnect ECU from ECU wiring harness coupler



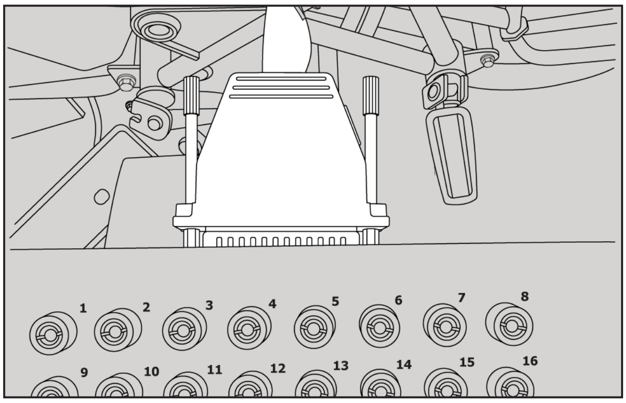
- Auto headlamp relay is located on Right side panel

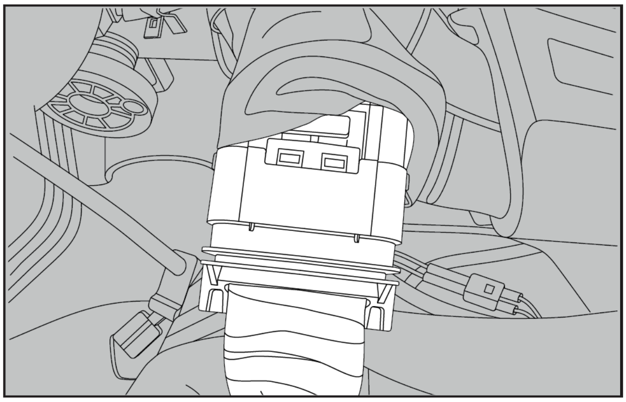


- Disconnect the head lamp control relay from the relay coupler



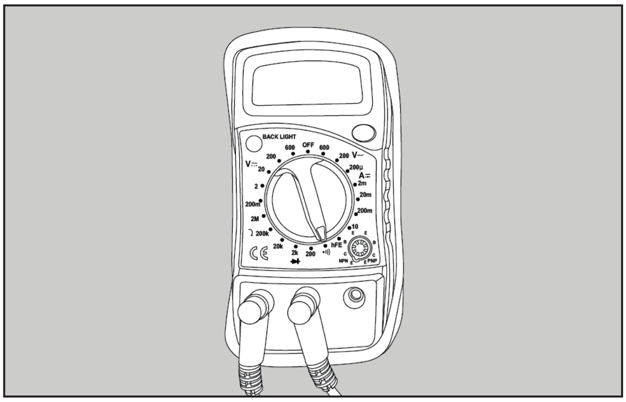
- Connect ECU break out box (62 Pin) kit to Breakout box Harness



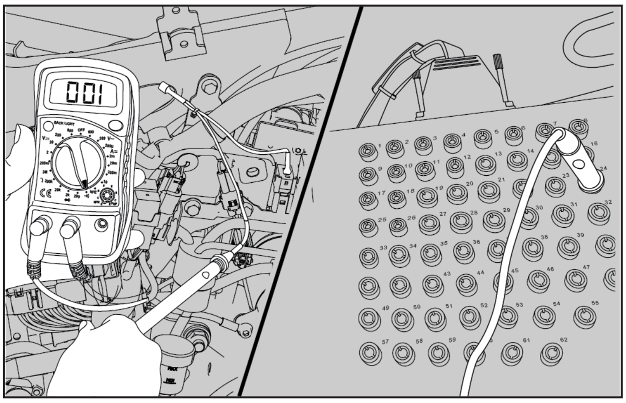


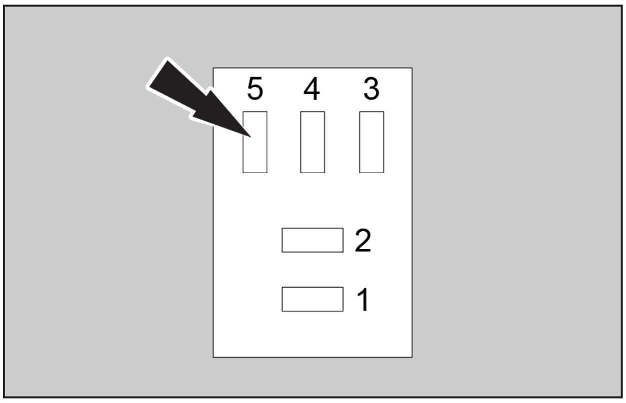
To check continuity of wiring harness

- Keep the multimeter in Continuity mode



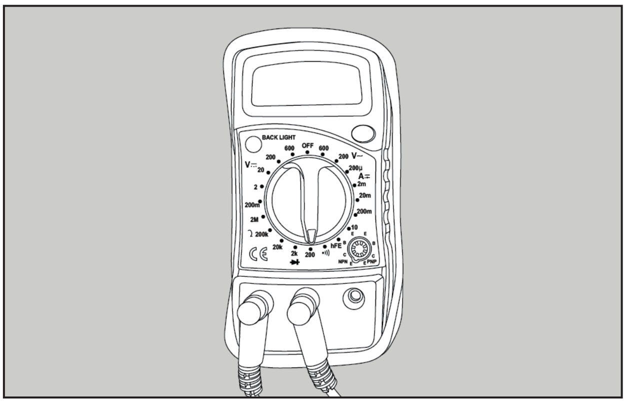
- To check continuity, keep the positive probe of the multimeter in head lamp relay pin 5 and negative probe in socket 24 of ECU breakout box. Check for continuity (Beep sound from multimeter)



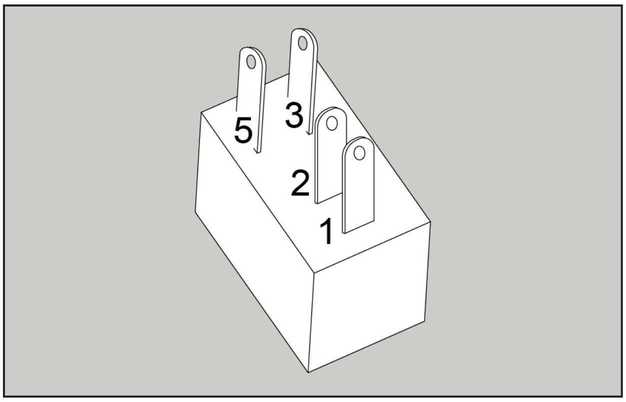


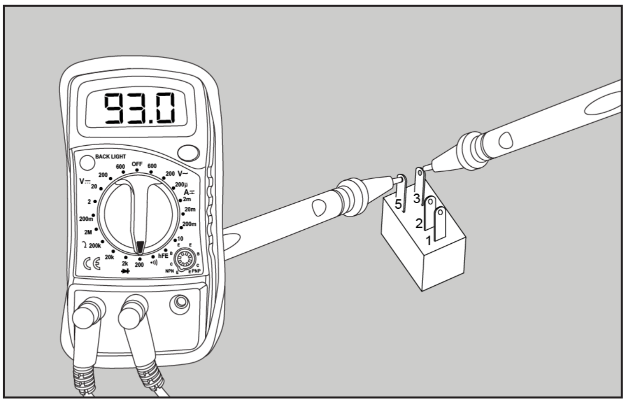
To check the resistance

- Keep the Multimeter in Resistance mode (200 Ohm)



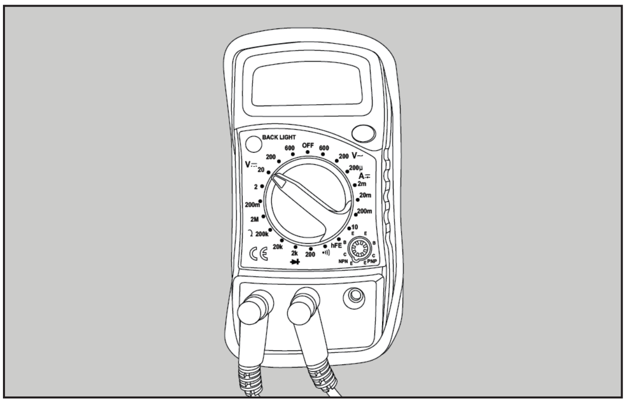
- Check the Resistance of Headlamp control relay coil between pin 3 and pin 5. Resistance should be between 82Ω to102Ω @ 30 5 °C



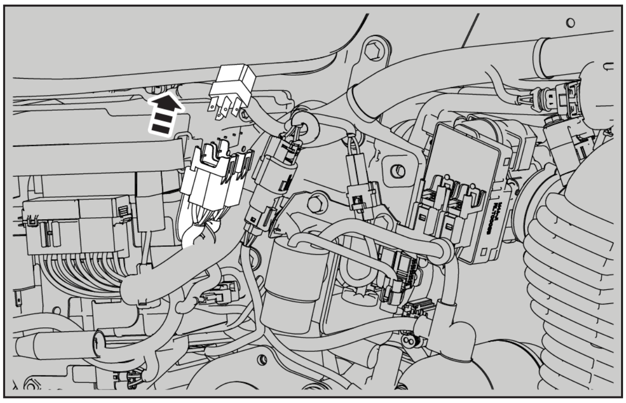


To check the voltage at ECU point (input voltage check)

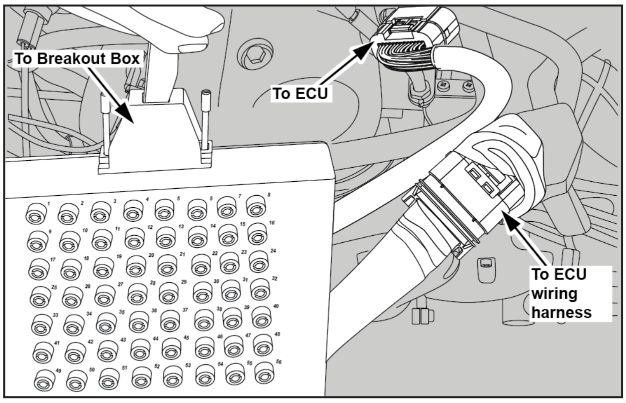
- Keep the Multimeter in Voltage mode (20 V)



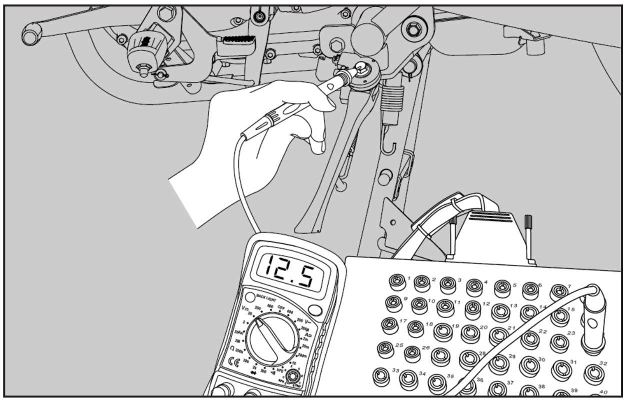
- Place the headlamp relay in the corresponding headlamp relay holder



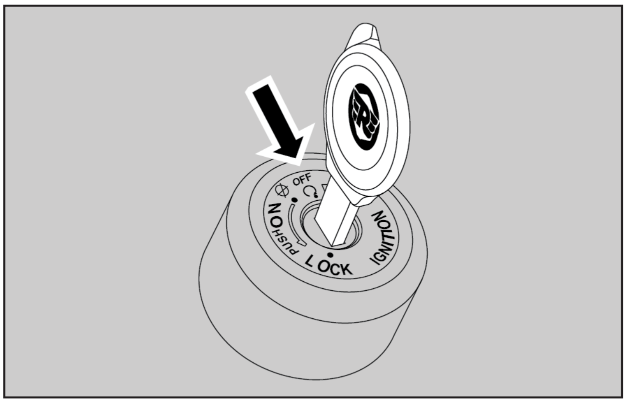
- Connect the ECU breakout box to ECU and wiring harness

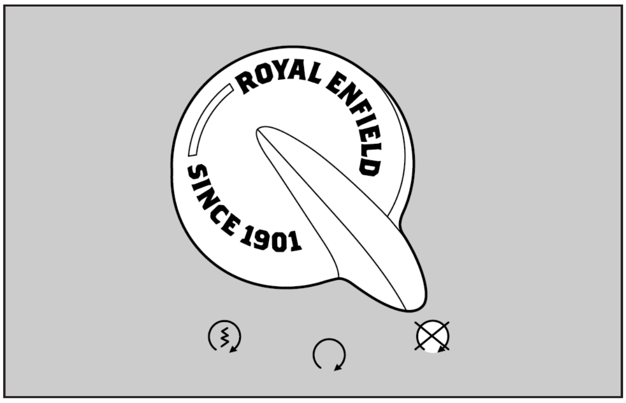

To Breakout Box
To ECU
To ECU wiring harness

- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 24 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative to socket 1 of the ECU breakout box.

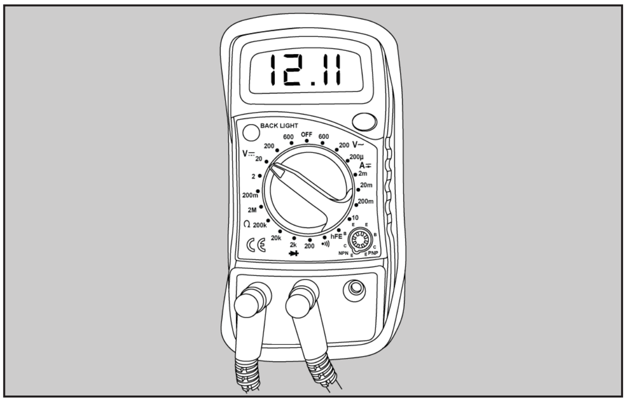


- Turn "ON" the ignition and kill switch


OFF
PUSH ON
LOCK
IGNITION

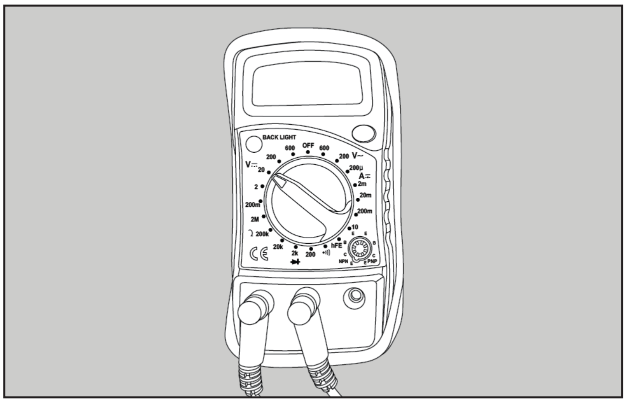

ROYAL ENFIELD
SINCE 1901

- Check the voltage of the battery and it should be 12 V in the Multimeter.

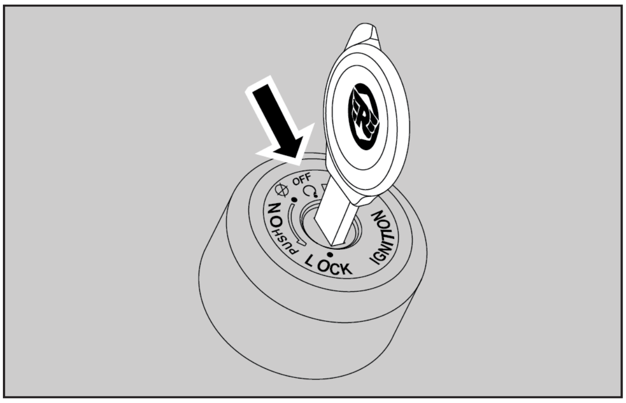


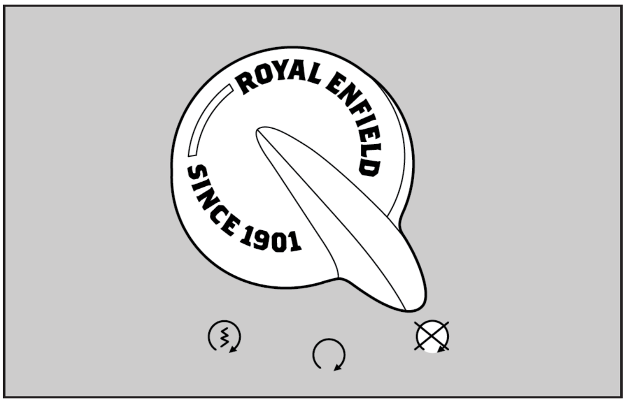
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

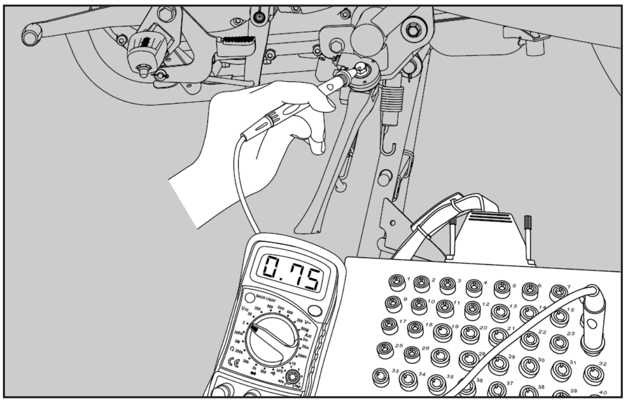


- Turn "ON" the Ignition switch, Kill switch and start the vehicle





- Check the voltage across socket 24 of the ECU breakout box and body ground/Battery Negative/ Socket 1 of the ECU breakout box



- Check the voltage and it should be a voltage of 0.75V.

d. DECISION POINT:

- If the resistance is not within the specified limit, You may please replace the headlamp control relay.
- If the output voltage is 0V (even after 10 seconds from the starting of the vehicle) you may have to replace the ECU.

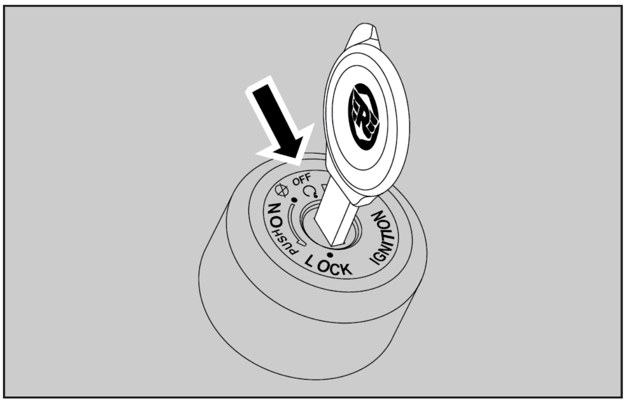
It is recommended to replace the headlamp control relay / ECU as per the advice from Royal Enfield only.

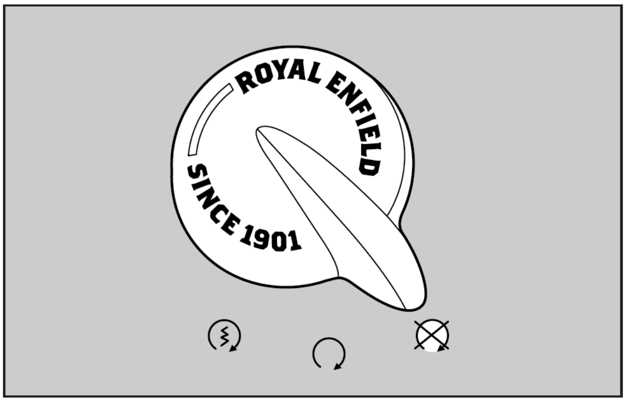
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





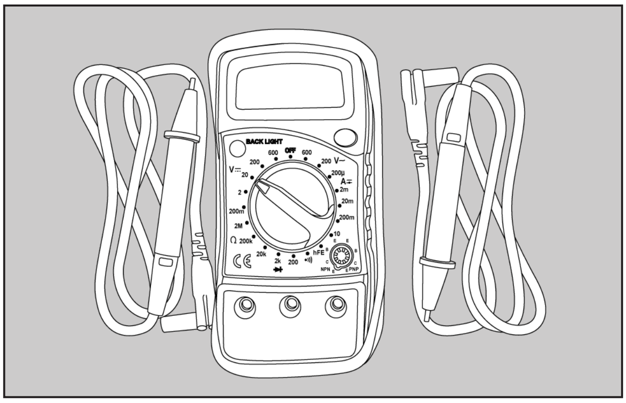
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **only to be used while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

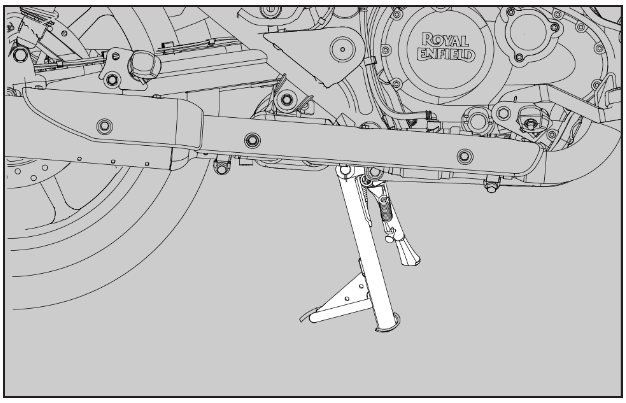


- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins -(hyperlink for the chart to be given here)

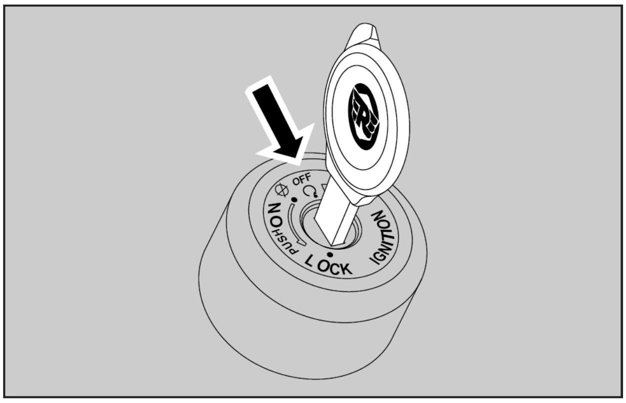
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

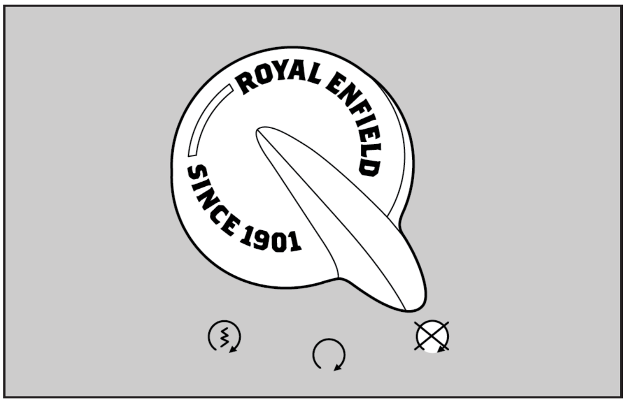
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

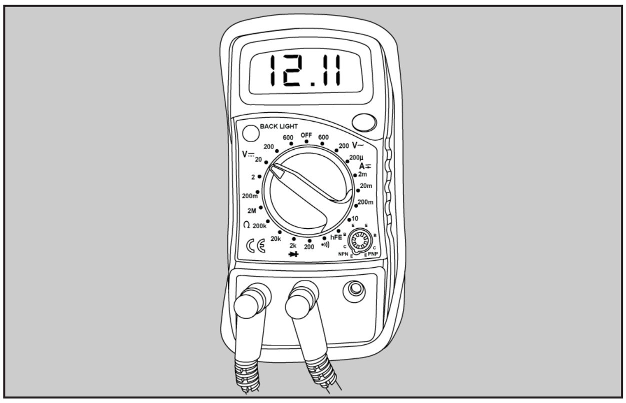


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

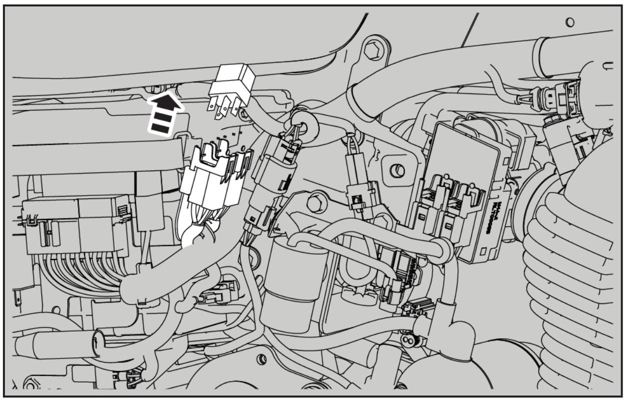
NOTE

- *Please remove the right-side panel from the motorcycle to access headlamp relay*

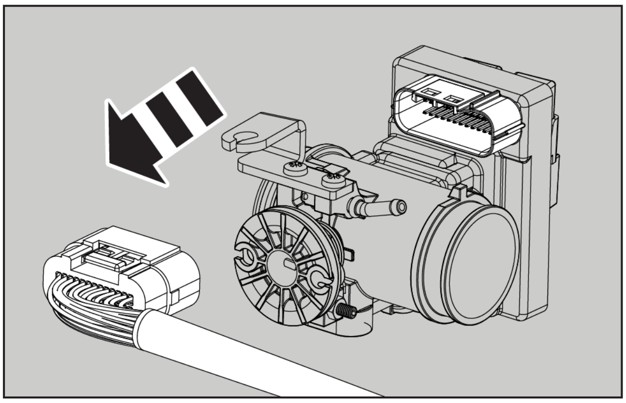
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Disconnect the Headlamp control relay



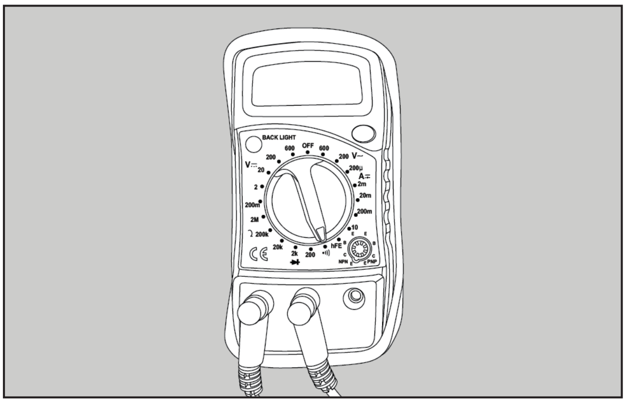
- Disconnect the ECU from ECU coupler



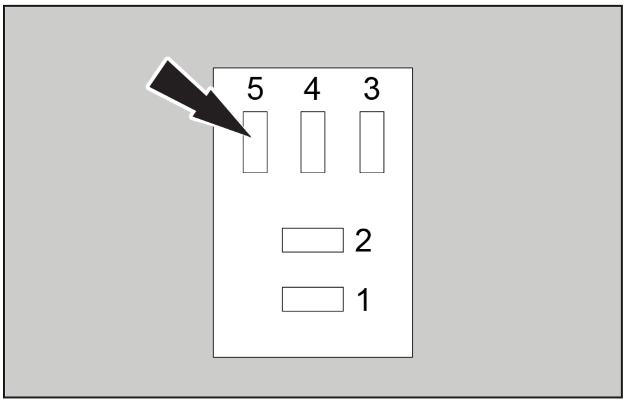
To check the Continuity of the wiring harness

STEP 1:

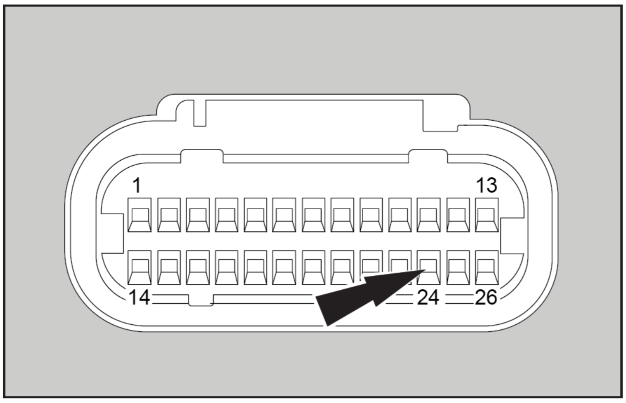
- Keep the multimeter in continuity mode



- Using a multimeter positive probe to Pin 5 of the headlamp relay wiring socket.



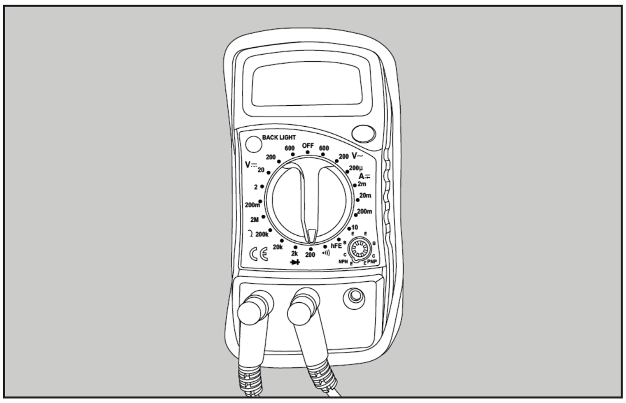
- Connect 40 series (yellow color) with the black tag to pin 24 of the ECU wiring harness coupler.



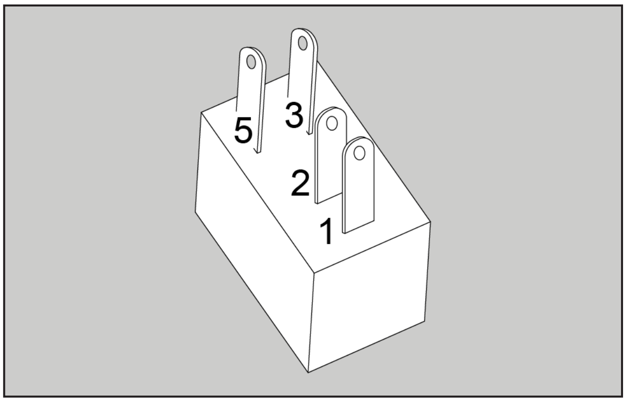
- Keep the positive probe of multimeter on the headlamp relay pin 5 and negative probe on the 40 series (yellow color) with the black tag on ECU coupler and check for continuity (Beep sound from a multimeter)

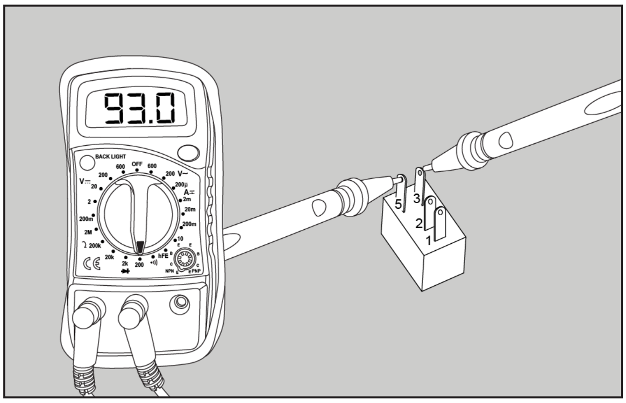
To check the Resistance

- Keep the Multimeter in Resistance mode (200 Ohm)



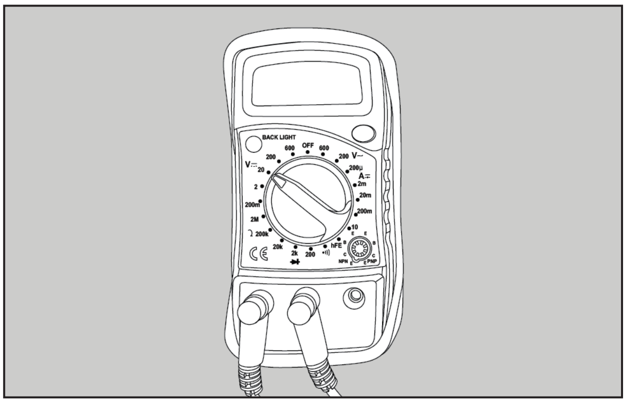
- Check the Resistance of Headlamp control relay coil connect positive probe of multimeter in pin 3 and negative probe in pin 5. Resistance should be between 82Ω to 102Ω @ 30 5 °C



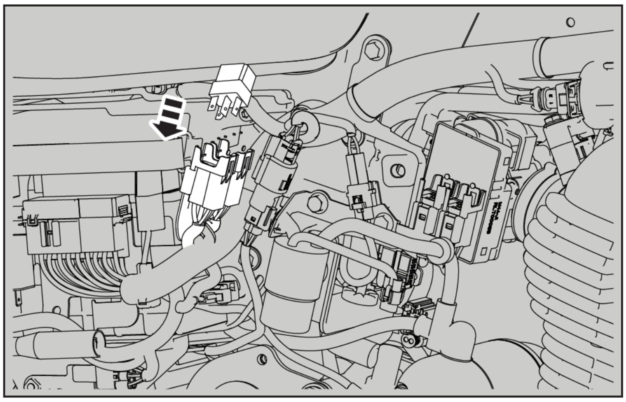


To check the voltage at ECU point (input voltage check)

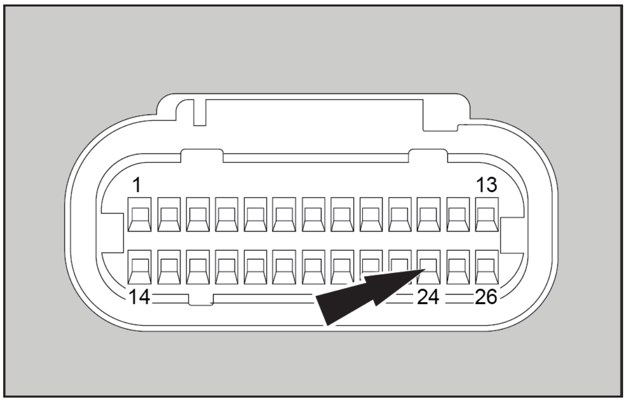
- Keep the Multimeter in Voltage mode (20 V)

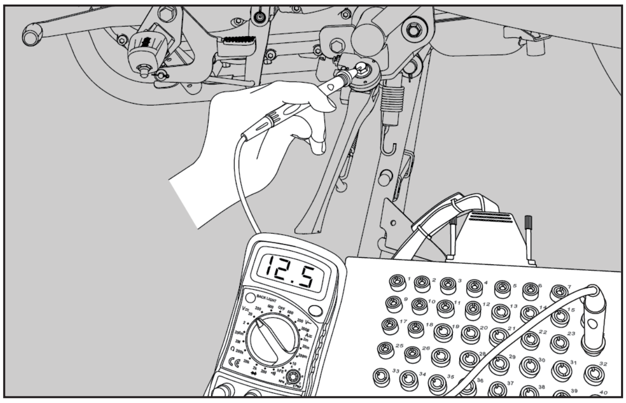


- Place the headlamp relay in the corresponding headlamp relay holder

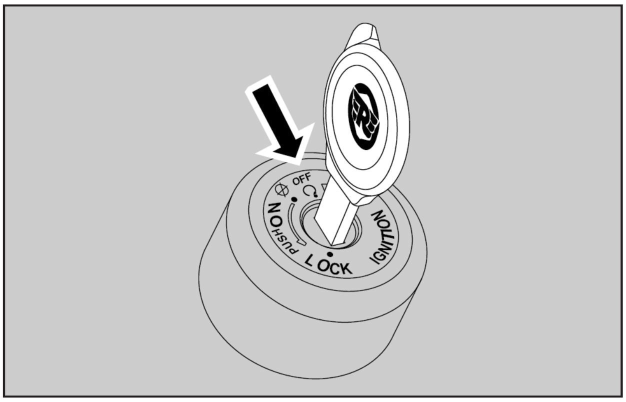


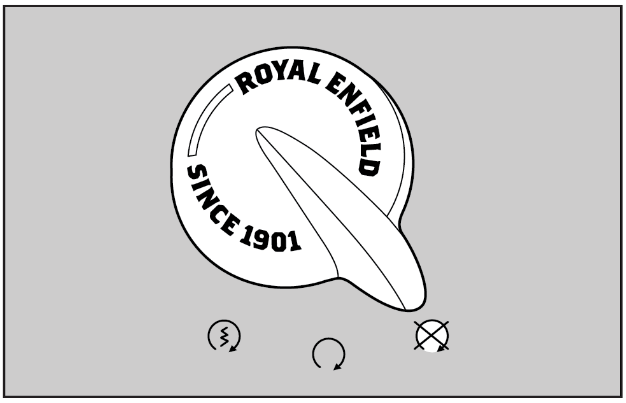
- To check input voltage at ECU point, place the positive probe of the multimeter in pin 24 of the ECU socket and place the negative probe of the Multimeter to body ground or Battery Negative.



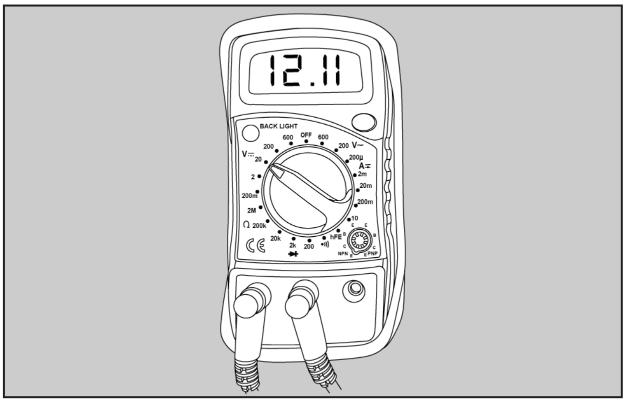


- Turn “ON” the ignition and kill switch


OFF
PUSH ON
LOCK
IGNITION

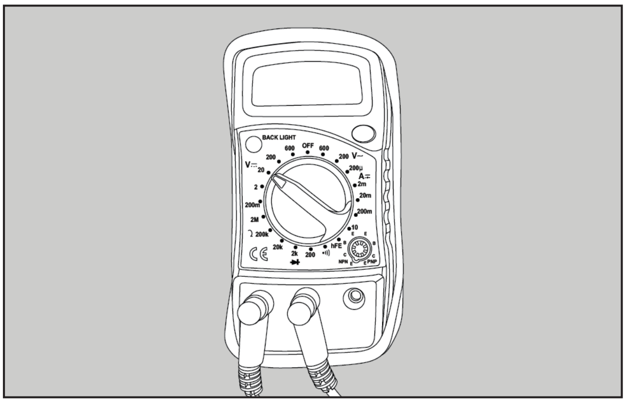

ROYAL ENFIELD
SINCE 1901

- Check the voltage it should be 12 V in the Multimeter.

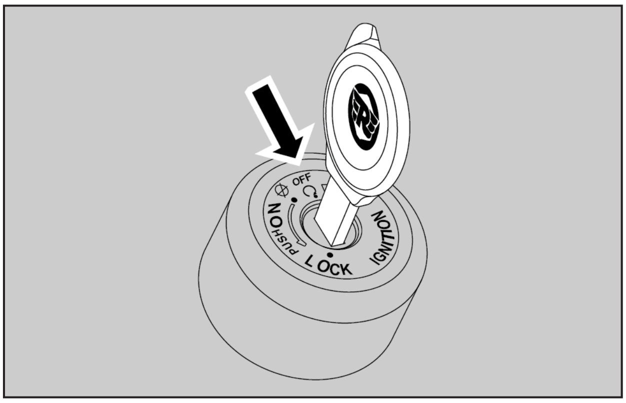


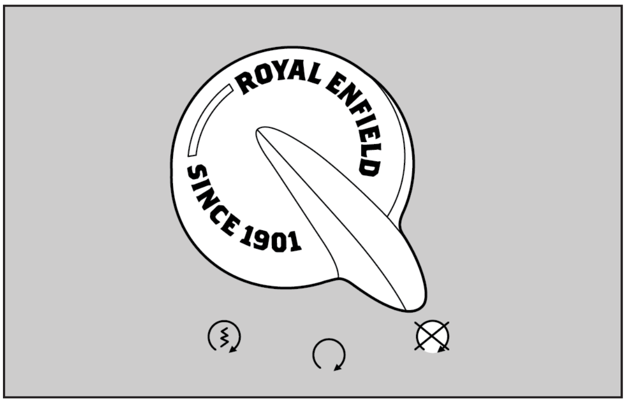
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

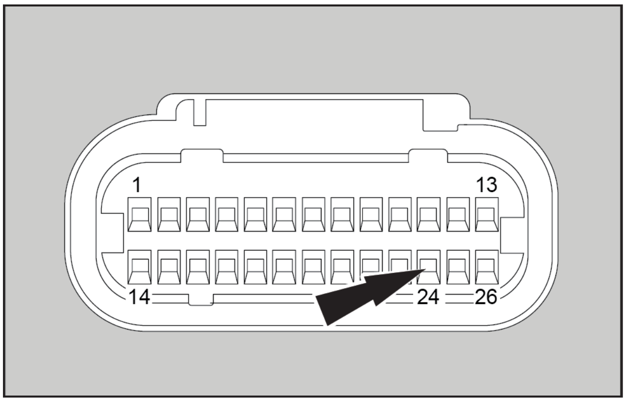


- Turn “ON” the Ignition switch, Kill switch and start the vehicle

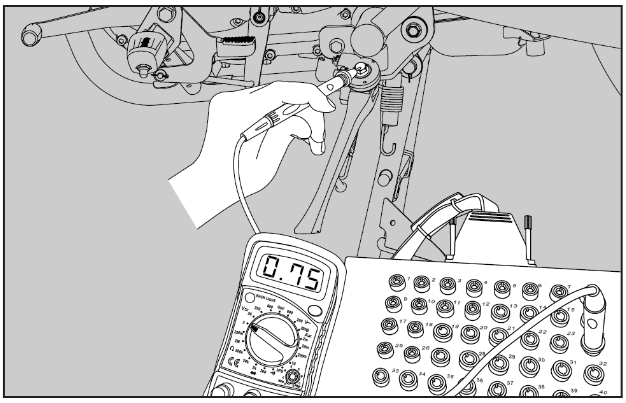

OFF
PUSH ON
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Check the voltage across pin 24 of the ECU socket and body ground or Battery Negative



- Check the voltage, it should be 0.75V.



d. Decision Point:

- If the voltage is meeting the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (82 - 102 Ohms), you replace with Headlamp control relay
- If the voltage is not meeting the specified limit (less than 12 V) and if continuity is available you have to replace the ECU.

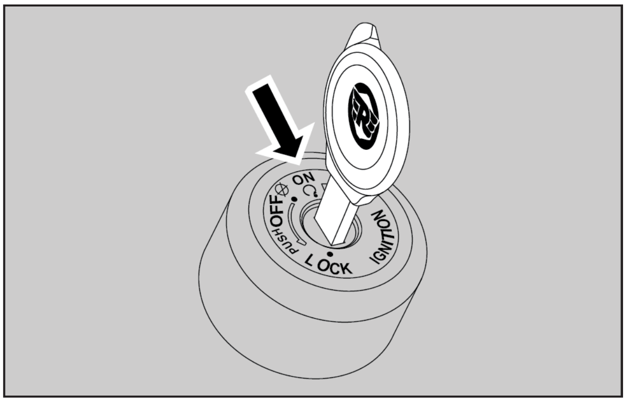
It is recommended to replace the headlamp control relay / ECU as per the advice from Royal Enfield only

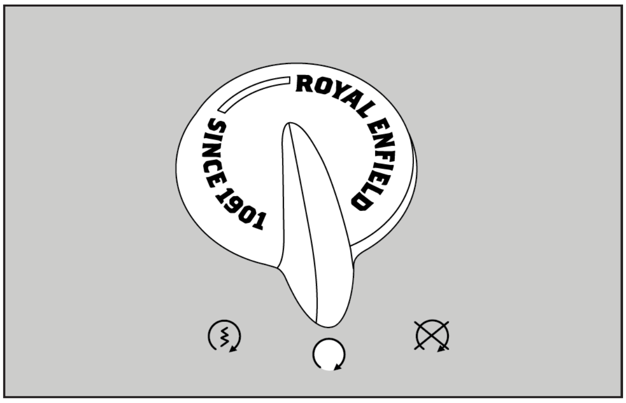
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched “ON”, DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in “ON” Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Switch “OFF” the ignition key and again switch “ON” - repeat this cycle for 3 times till the MIL is “OFF”
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P1639 - HEAD LAMP CONTROL DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1639	Head Lamp Control	Head Lamp Control Circuit high

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE: DTC CODE: P1639

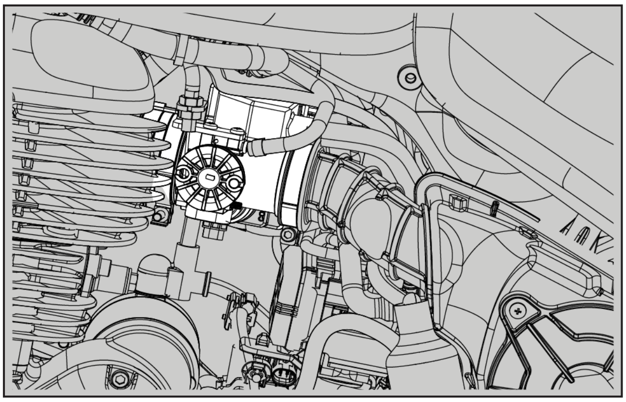
Type of error : Head Lamp Control Circuit high

(i) Information : Head Lamp Control circuit fault / Head Lamp Control relay fault

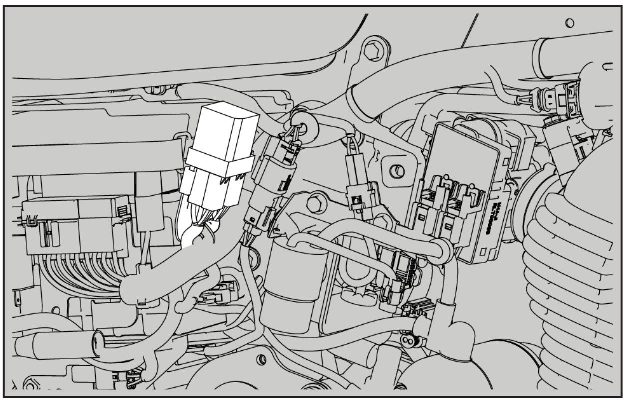
b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

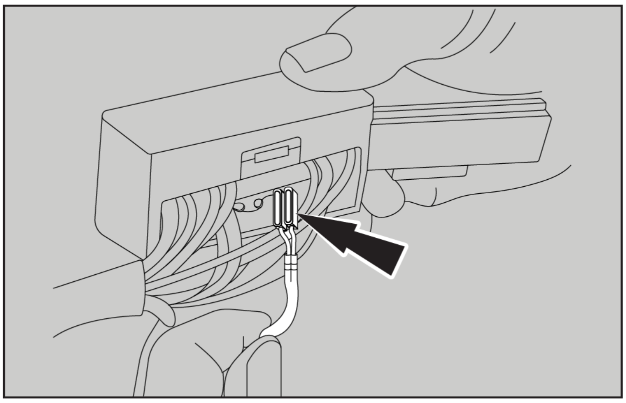
- ECU is located on the throttle body assembly



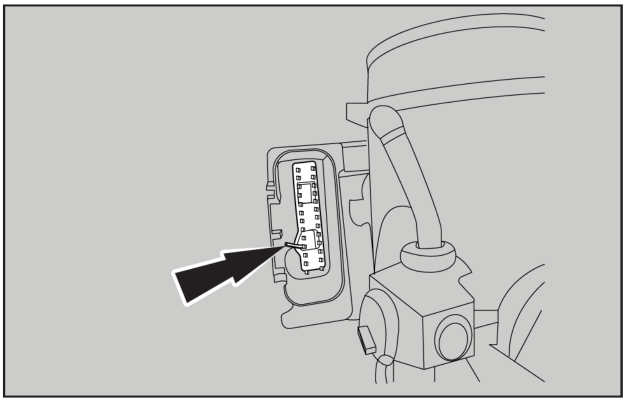
- Auto headlamp relay is located on Right side panel



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part

It is recommended to replace the ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

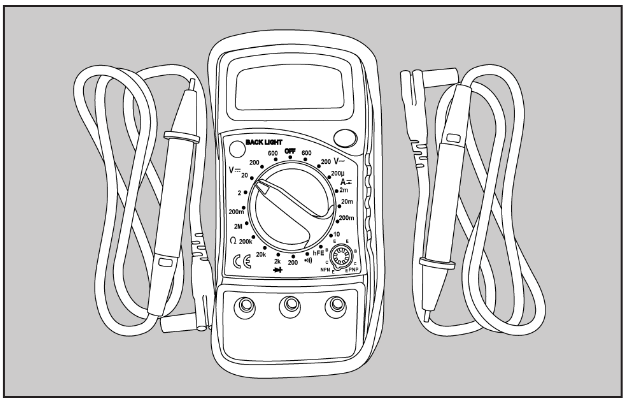
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

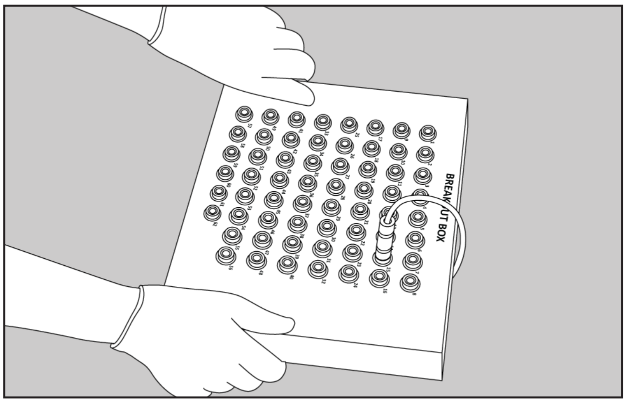
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)

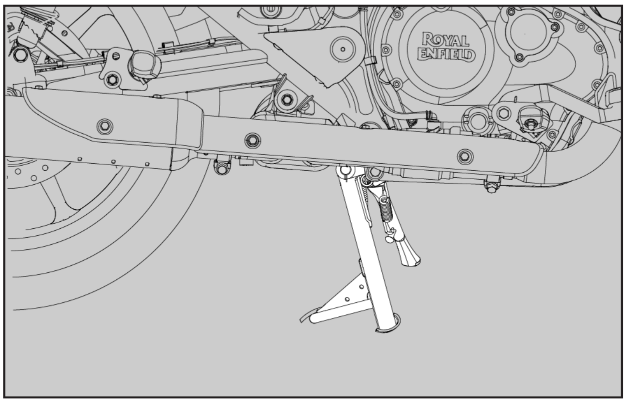


- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

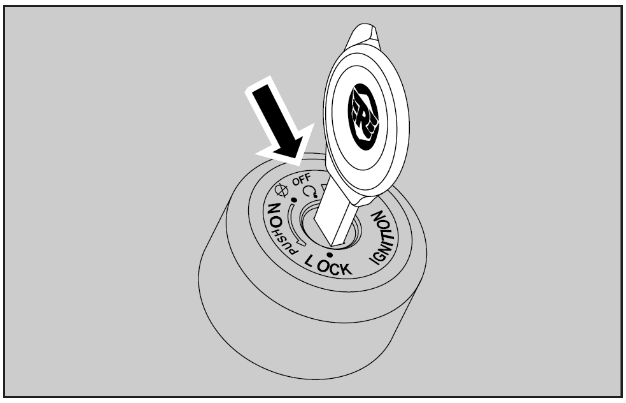


b. Pre-Checks:

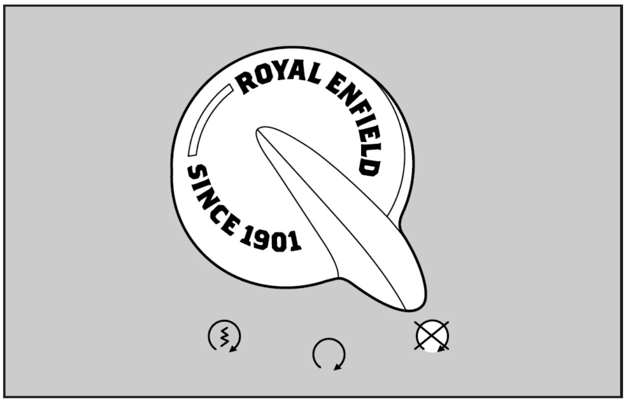
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

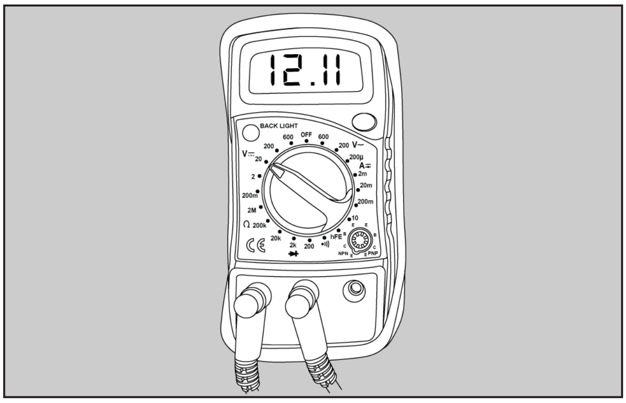


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12V (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition “ON” condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

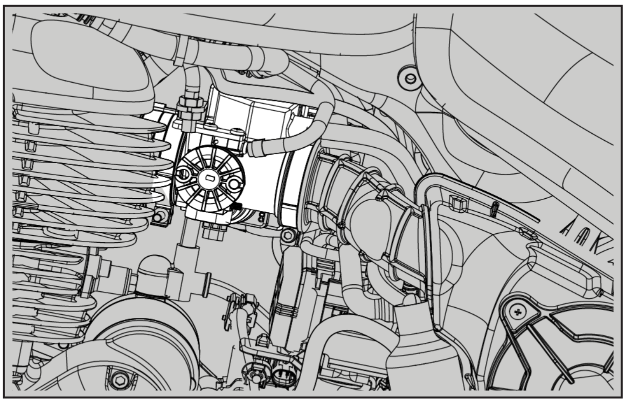
NOTE

- *Please remove the right-side panel from the motorcycle to access headlamp relay*

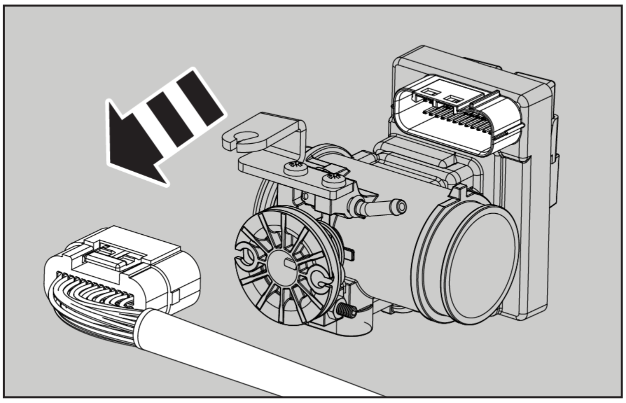
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

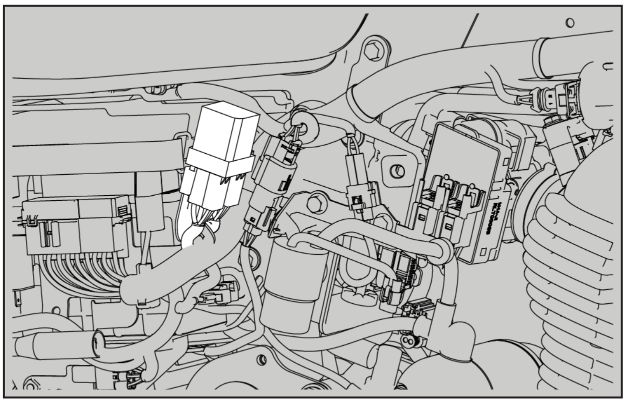
- ECU is located in the throttle body assembly



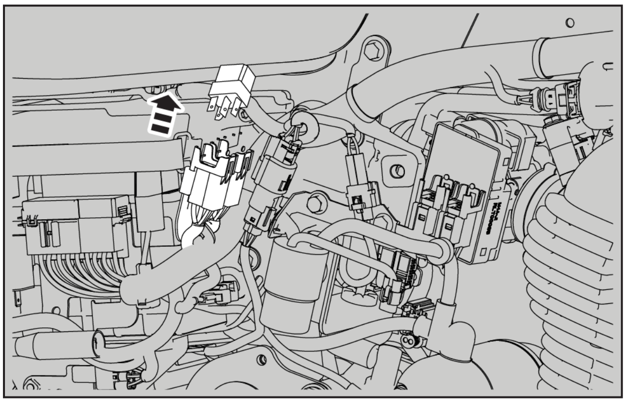
- Disconnect ECU from ECU wiring harness coupler



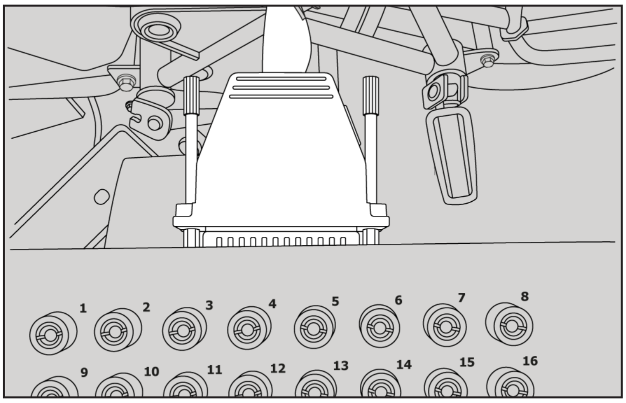
- Auto headlamp relay is located on Right side panel



- Disconnect the head lamp control relay from the relay coupler



- Connect ECU break out box (62 Pin) kit to Breakout box Harness


1
2
3
4
5
6
7
8
9
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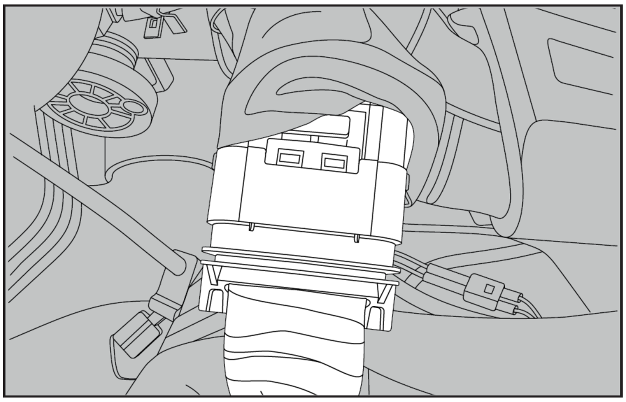
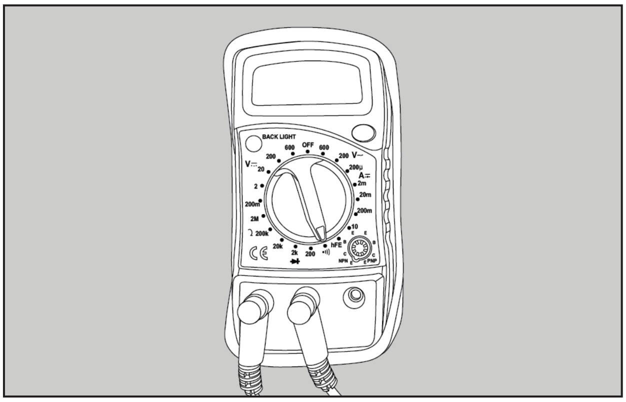
12
13
14
15
16

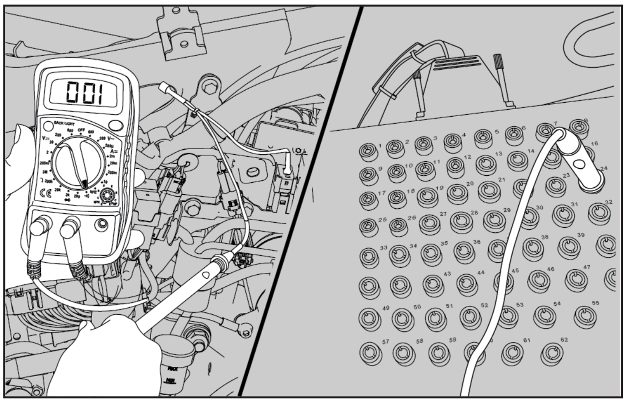


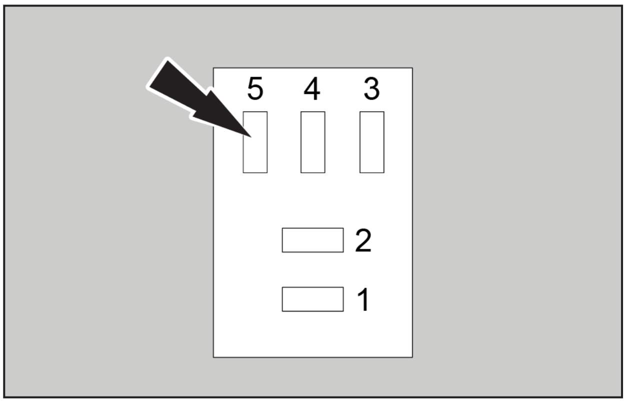
To check continuity of wiring harness

- Keep the multimeter in Continuity mode


BACK LIGHT
600
OFF
600
200
V⎓
20
2
200m
2M
200k
20k
2k
200
hFE
200
V~
200µ
A⎓
2m
20m
200m
10
E
B
C
NPN
PNP

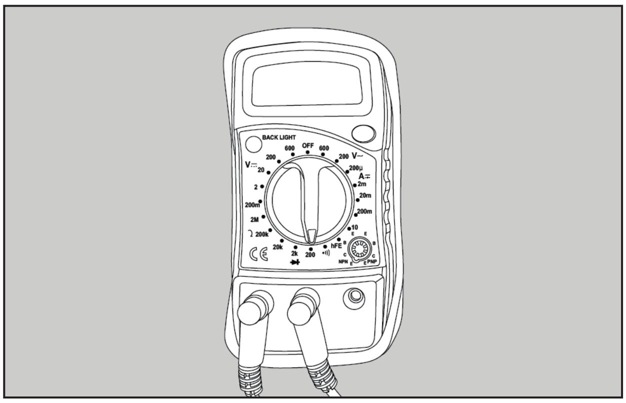
- To check continuity, keep the positive probe of the multimeter in head lamp relay pin 5 and negative probe in socket 24 of ECU breakout box. Check for continuity (Beep sound from multimeter)



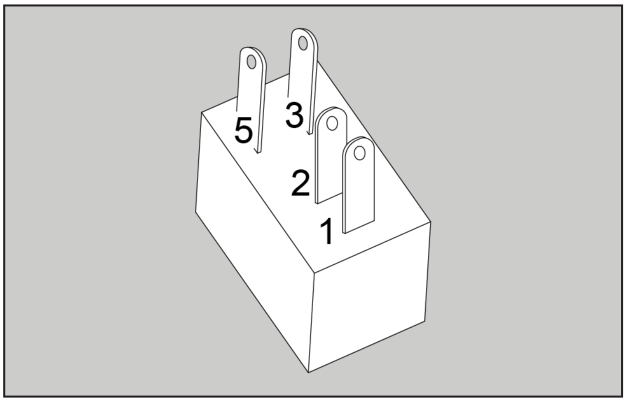


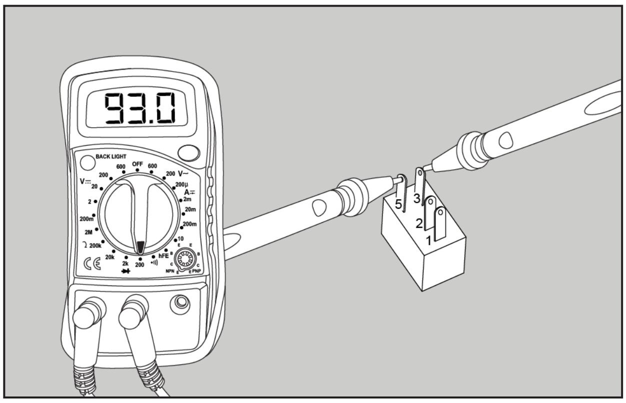
To check the resistance

- Keep the Multimeter in Resistance mode (200 Ohm)



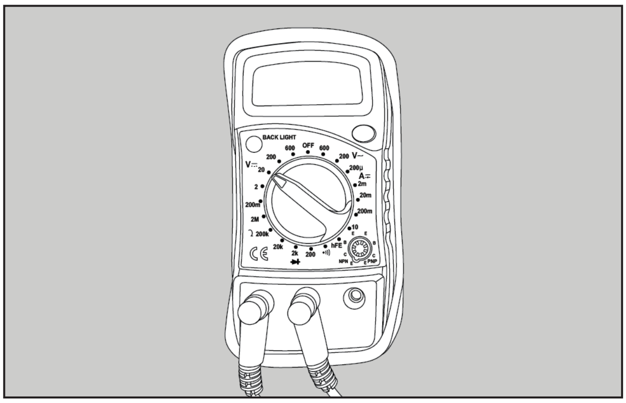
- Check the Resistance of Headlamp control relay coil between pin 3 and pin 5. Resistance should be between 82Ω to102Ω @ 30 5 °C



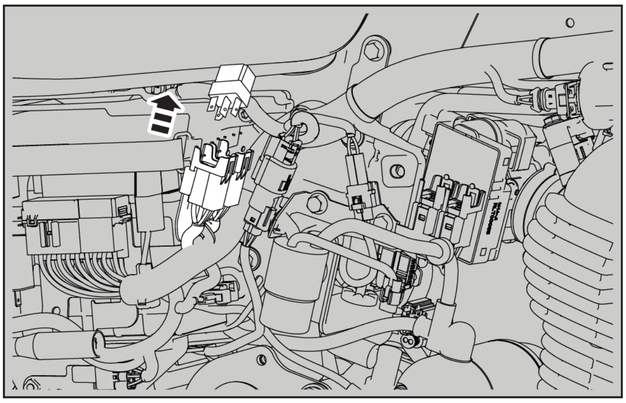


To check the voltage at ECU point (input voltage check)

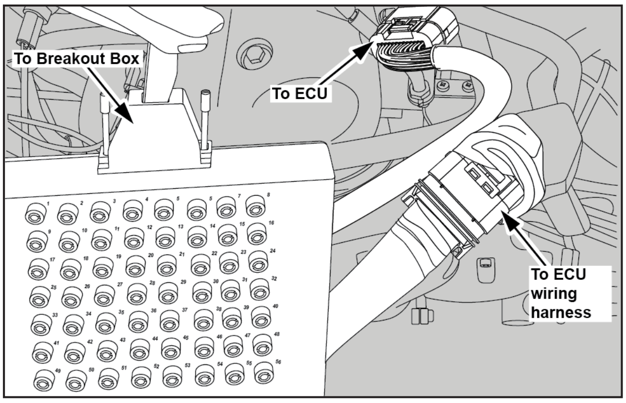
- Keep the Multimeter in Voltage mode (20 V)



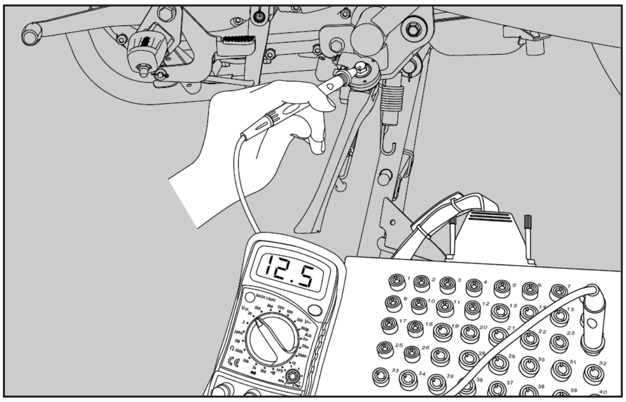
- Place the headlamp relay in the corresponding headlamp relay holder



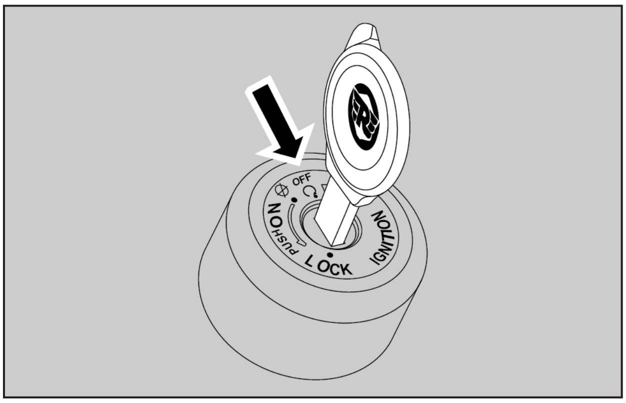
- Connect the ECU breakout box to ECU and wiring harness

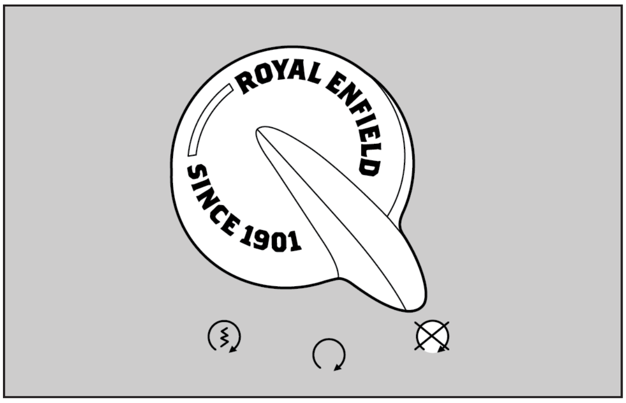

To Breakout Box
To ECU
To ECU wiring harness

- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 24 of the ECU breakout box and place the negative probe of the Multimeter to body ground/Battery negative to socket 1 of the ECU breakout box.

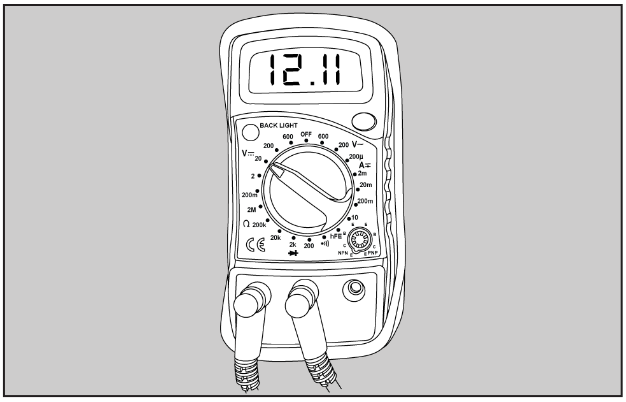


- Turn "ON" the ignition and kill switch


OFF
PUSH ON
LOCK
IGNITION

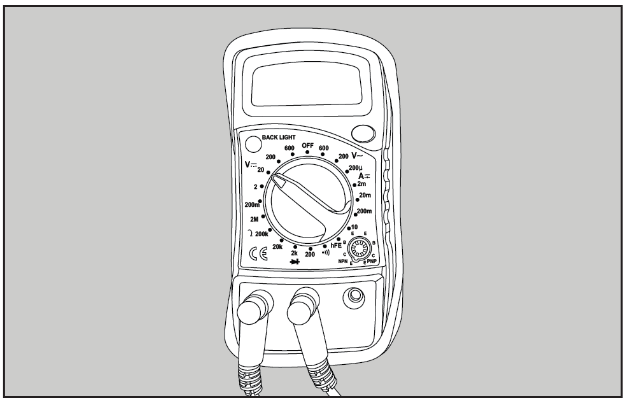

ROYAL ENFIELD
SINCE 1901

- Check the voltage of the battery and it should be 12 V in the Multimeter.

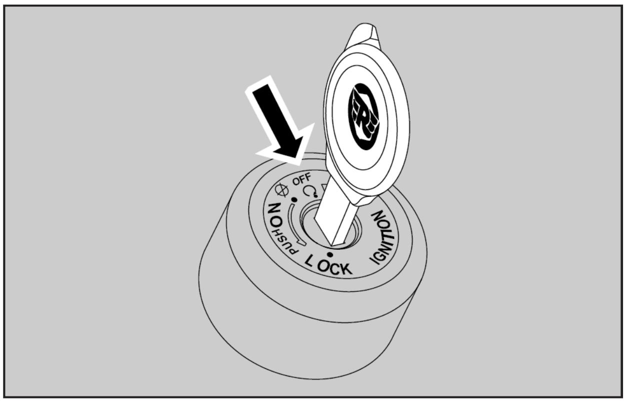


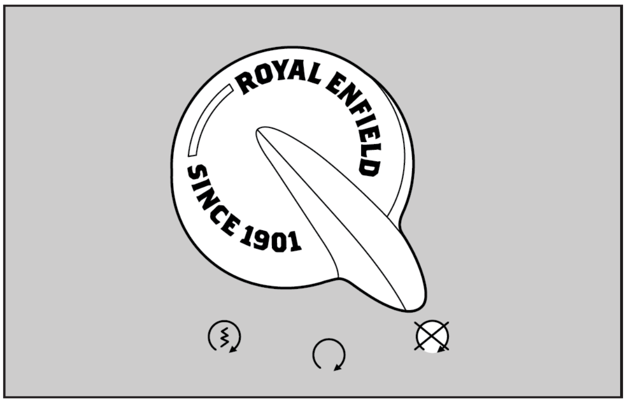
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

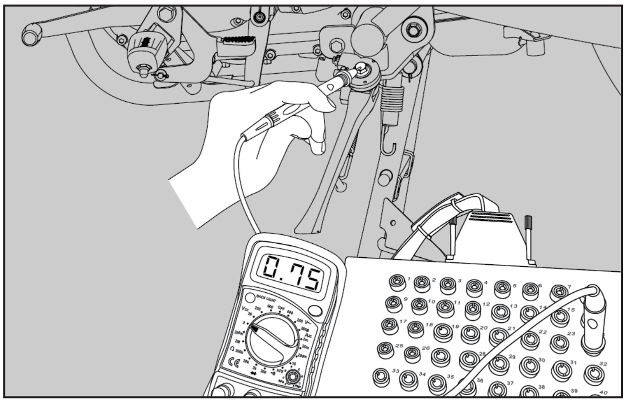


- Turn "ON" the Ignition switch, Kill switch and start the vehicle





- Check the voltage across socket 24 of the ECU breakout box and body ground/Battery Negative/ Socket 1 of the ECU breakout box



- Check the voltage and it should be a voltage of 0.75V.

d. DECISION POINT:

- If the resistance is not within the specified limit, You may please replace the headlamp control relay.
- If the output voltage is 0V (even after 10 seconds from the starting of the vehicle) you may have to replace the ECU.

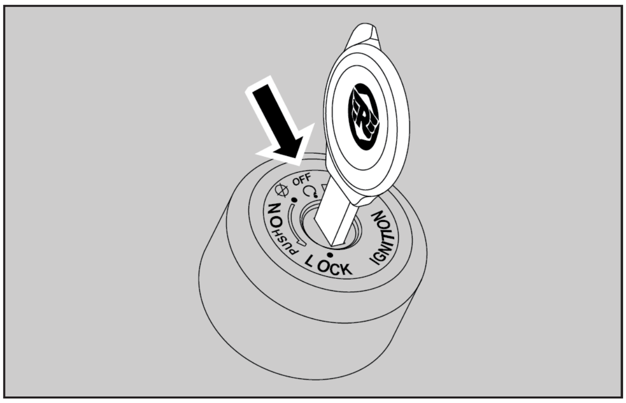
It is recommended to replace the headlamp control relay / ECU as per the advice from Royal Enfield only.

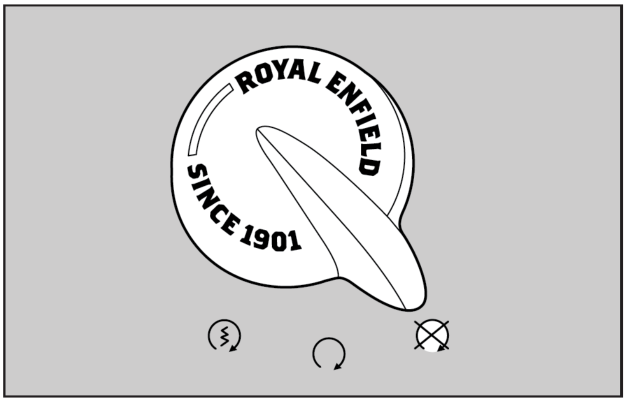
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





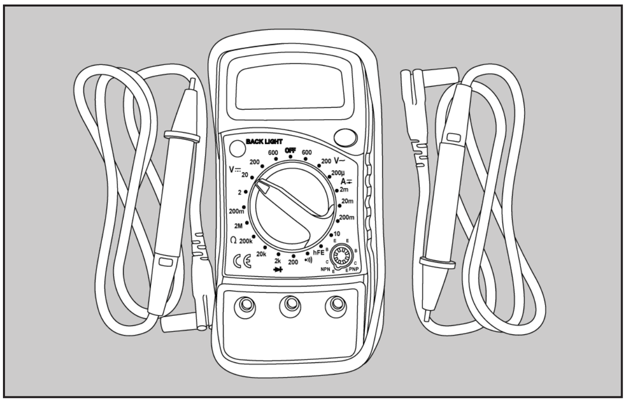
- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **only to be used while diagnosis only to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

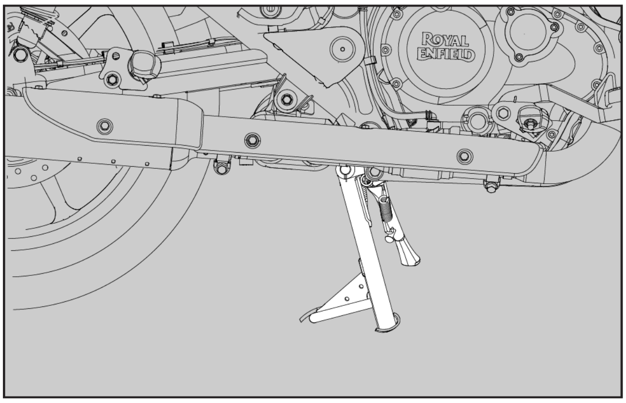


- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins -(hyperlink for the chart to be given here)

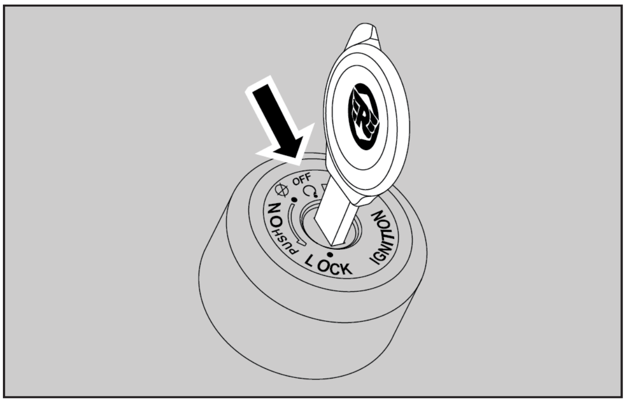
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

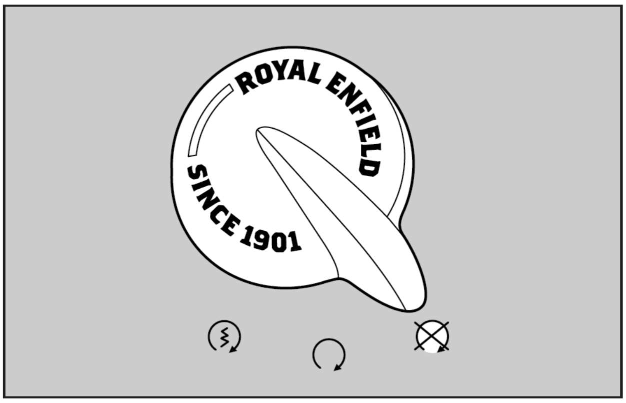
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

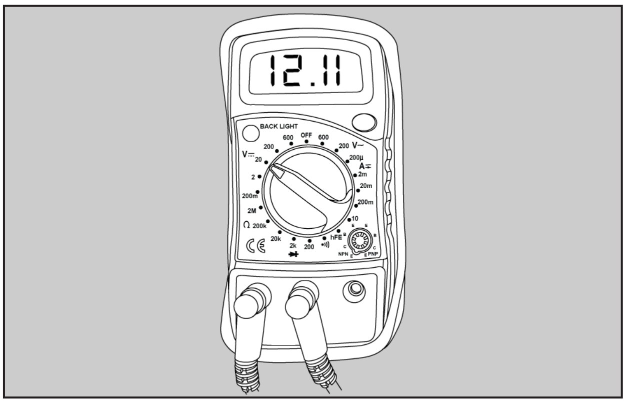


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

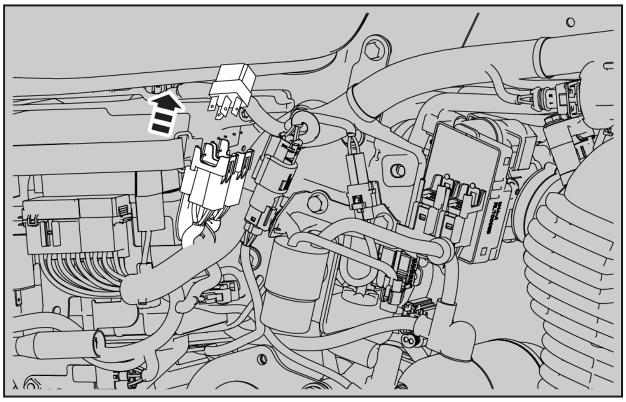
NOTE

- *Please remove the right-side panel from the motorcycle to access headlamp relay*

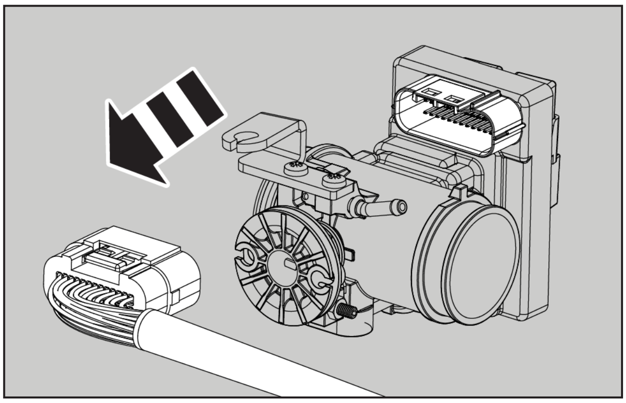
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Disconnect the Headlamp control relay



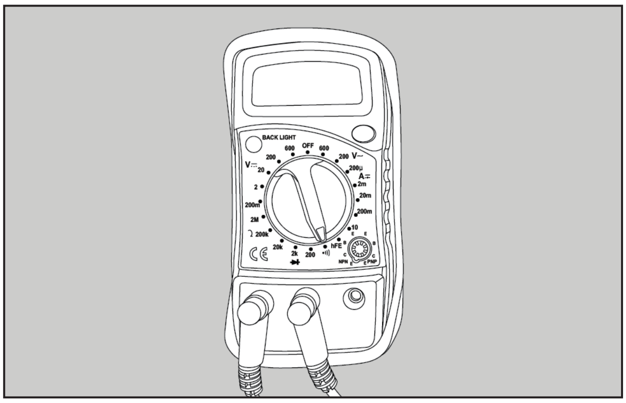
- Disconnect the ECU from ECU coupler



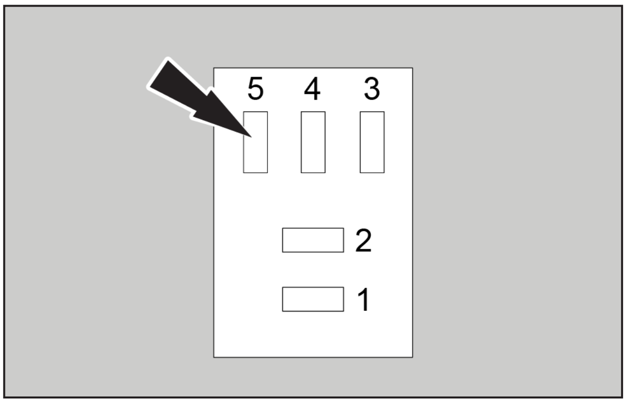
To check the Continuity of the wiring harness

STEP 1:

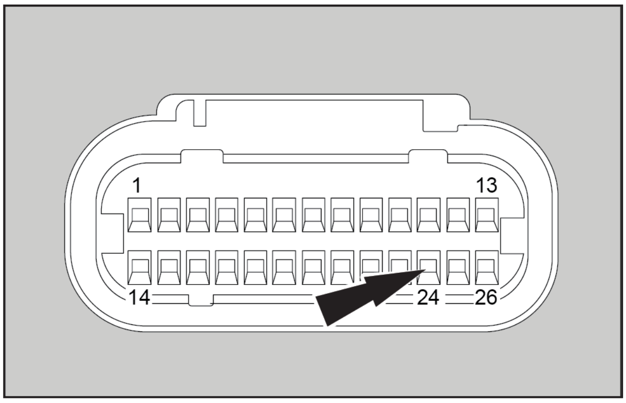
- Keep the multimeter in continuity mode



- Using a multimeter positive probe to Pin 5 of the headlamp relay wiring socket.



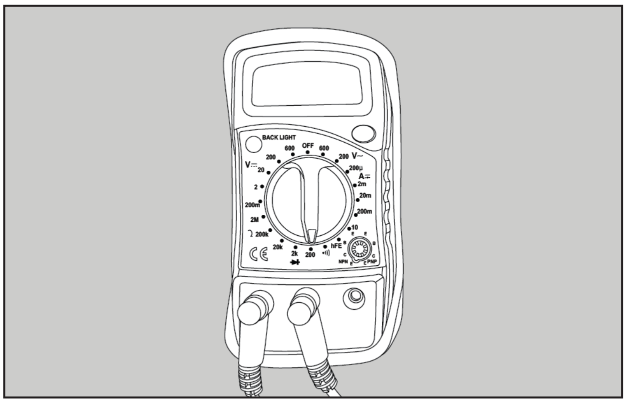
- Connect 40 series (yellow color) with the black tag to pin 24 of the ECU wiring harness coupler.



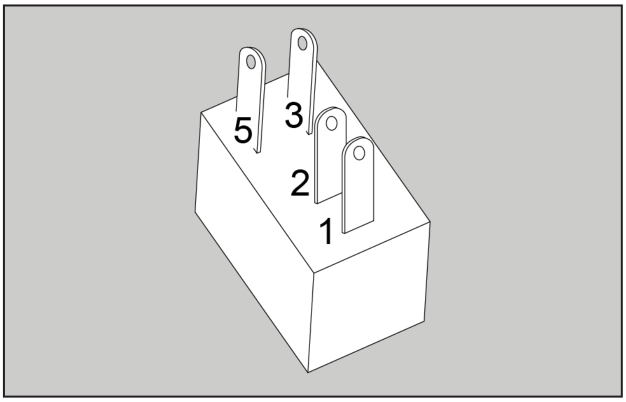
- Keep the positive probe of multimeter on the headlamp relay pin 5 and negative probe on the 40 series (yellow color) with the black tag on ECU coupler and check for continuity (Beep sound from a multimeter)

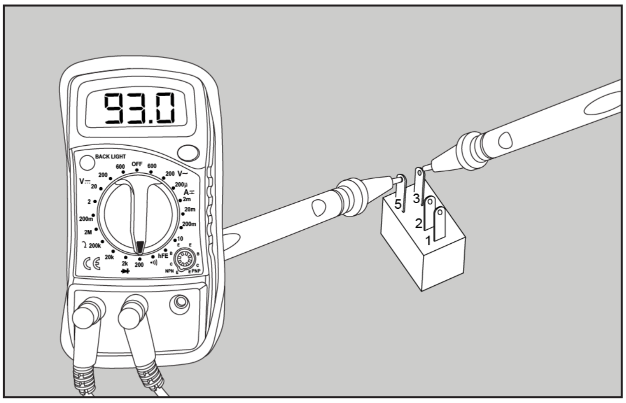
To check the Resistance

- Keep the Multimeter in Resistance mode (200 Ohm)



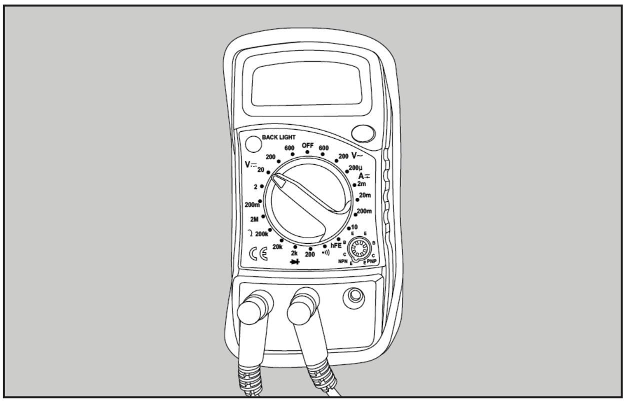
- Check the Resistance of Headlamp control relay coil connect positive probe of multimeter in pin 3 and negative probe in pin 5. Resistance should be between 82Ω to 102Ω @ 30 5 °C



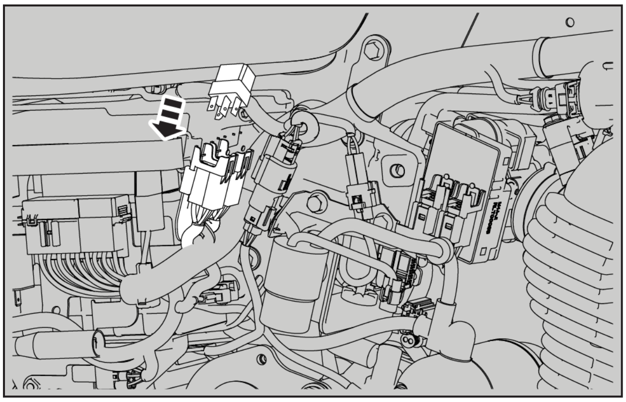


To check the voltage at ECU point (input voltage check)

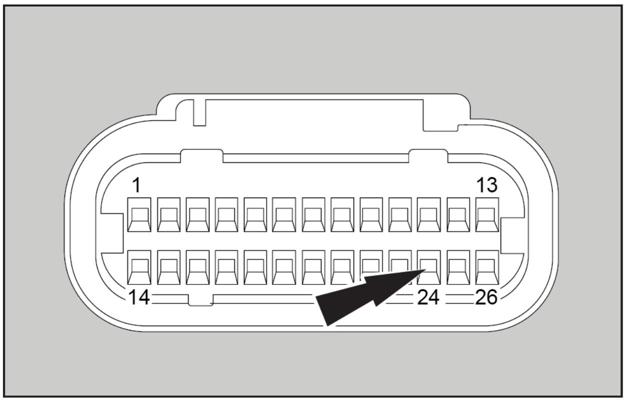
- Keep the Multimeter in Voltage mode (20 V)

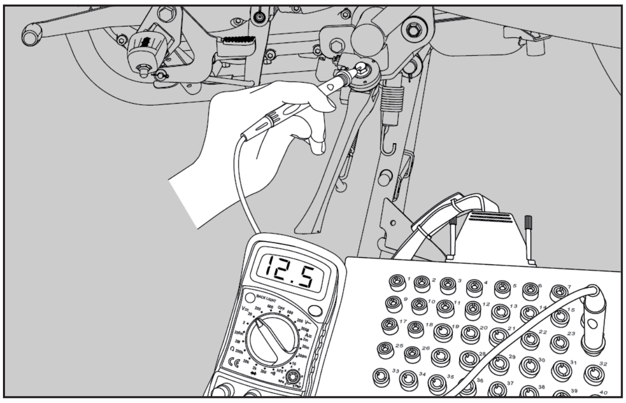


- Place the headlamp relay in the corresponding headlamp relay holder

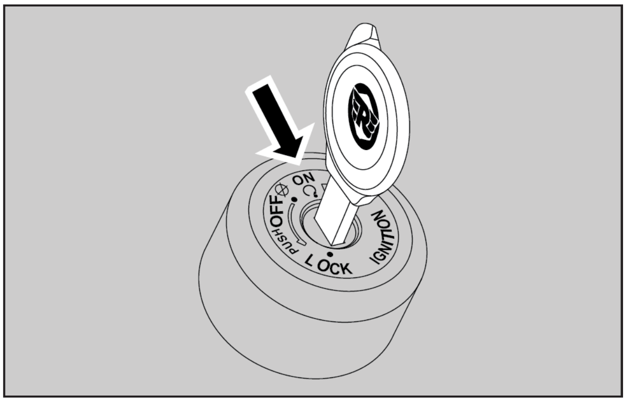


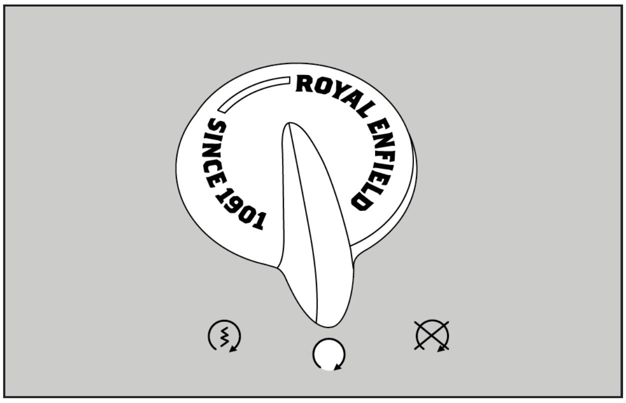
- To check input voltage at ECU point, place the positive probe of the multimeter in pin 24 of the ECU socket and place the negative probe of the Multimeter to body ground or Battery Negative.



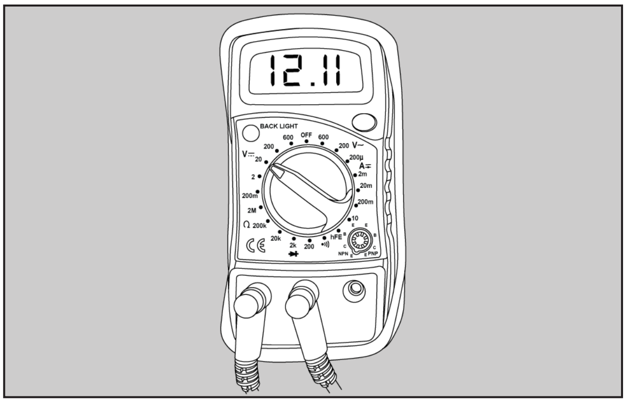


- Turn “ON” the ignition and kill switch


ON
OFF
PUSH
LOCK
IGNITION

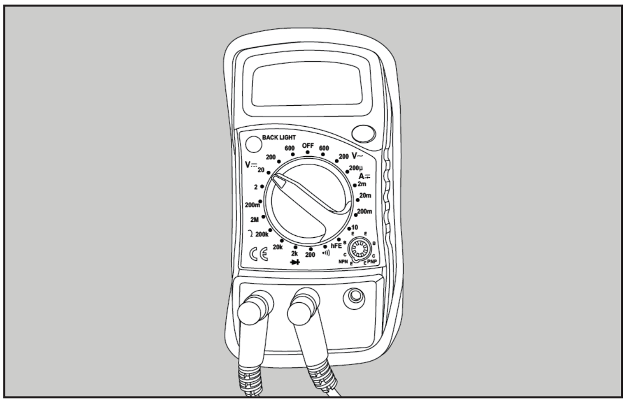

ROYAL ENFIELD
SINCE 1901

- Check the voltage it should be 12 V in the Multimeter.

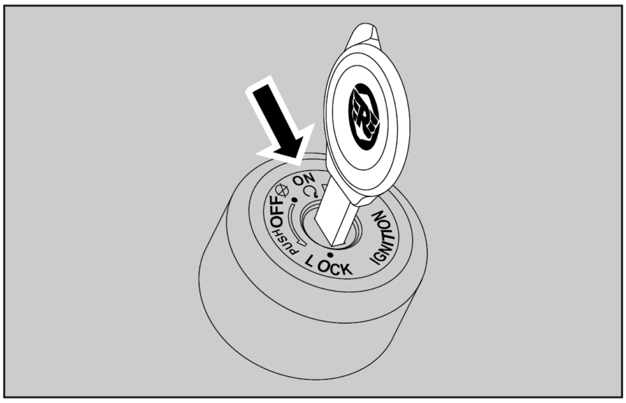

12.11
BACK LIGHT

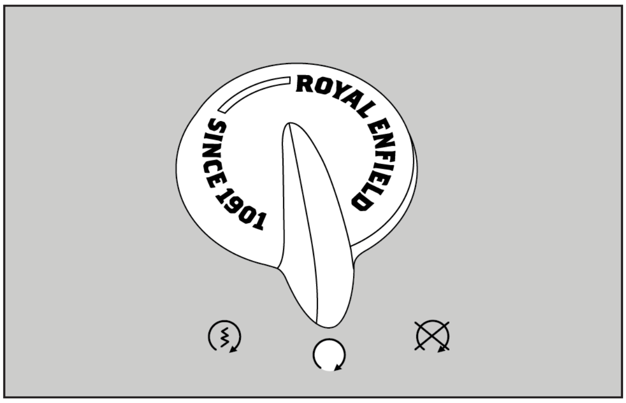
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

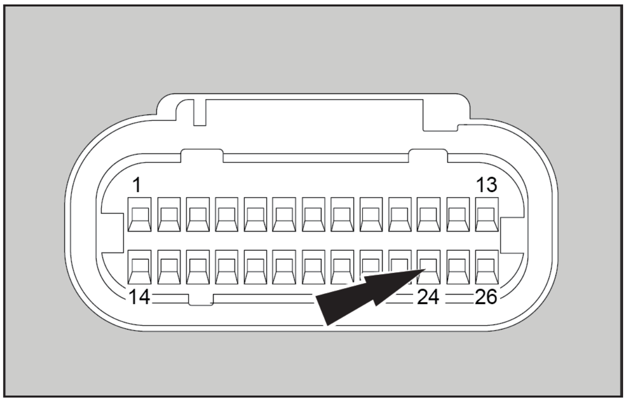


- Turn “ON” the Ignition switch, Kill switch and start the vehicle

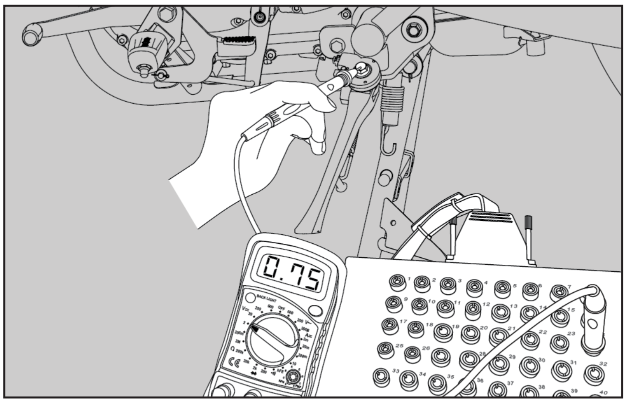

ON
OFF
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Check the voltage across pin 24 of the ECU socket and body ground or Battery Negative



- Check the voltage, it should be 0.75V.



d. Decision Point:

- If the voltage is meeting the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (82 - 102 Ohms), you replace with Headlamp control relay
- If the voltage is not meeting the specified limit (less than 12 V) and if continuity is available you have to replace the ECU.

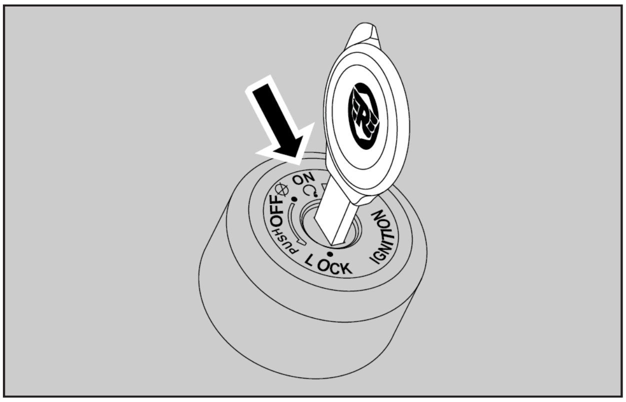
It is recommended to replace the headlamp control relay / ECU as per the advice from Royal Enfield only

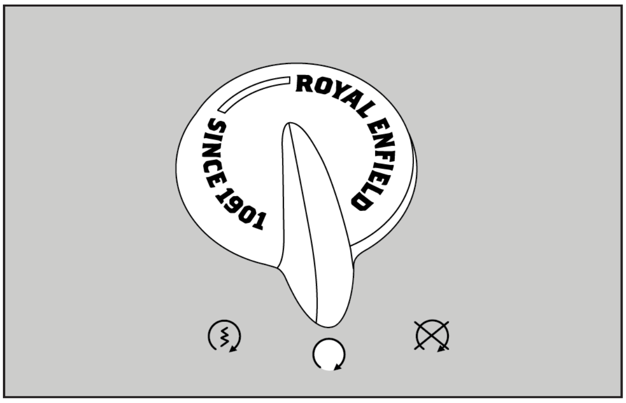
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P0219- CRANK SENSOR

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0219	Crank sensor	Engine over speed

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Crank sensor is also called as pulsar coil

TROUBLE CODE : DTC CODE: P0219

Type of error : Engine over speed

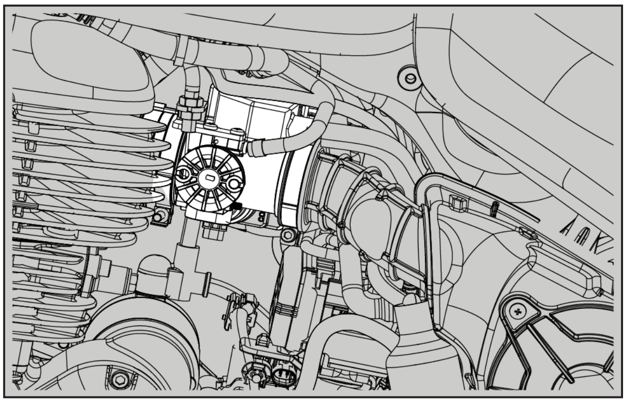
(i) Information : Crank sensor circuit fault / Crank sensor internal fault (Suggested Simple Description)

b.Preliminary Checks (Basic Check Points):

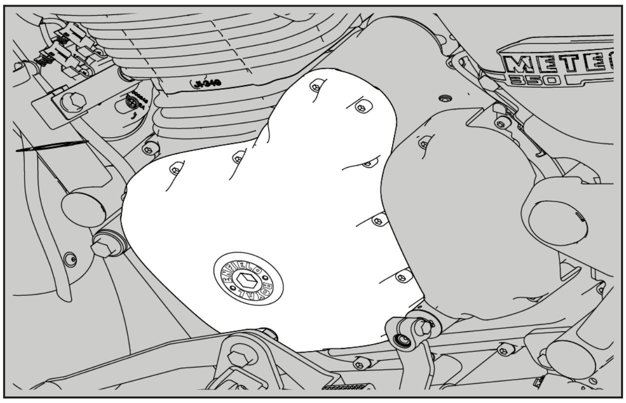
⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

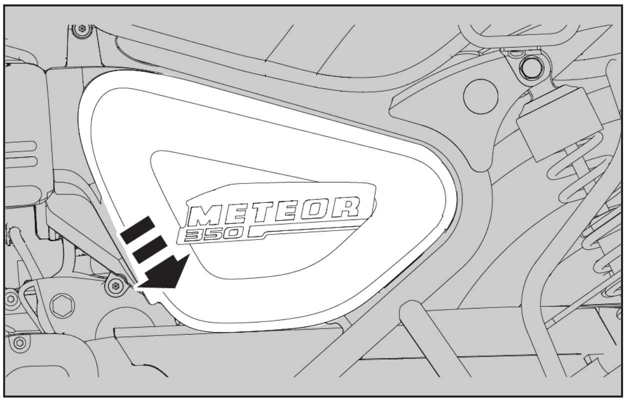
- ECU is located on the throttle body assembly



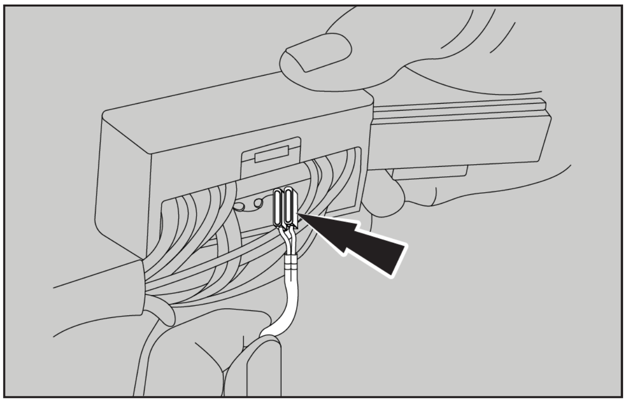
- The crank sensor is located on Left side engine crankcase



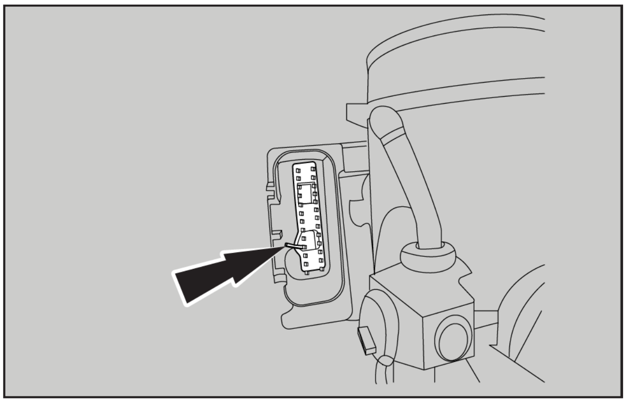
- Crank sensor coupler is located inside LH side panel bottom side



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

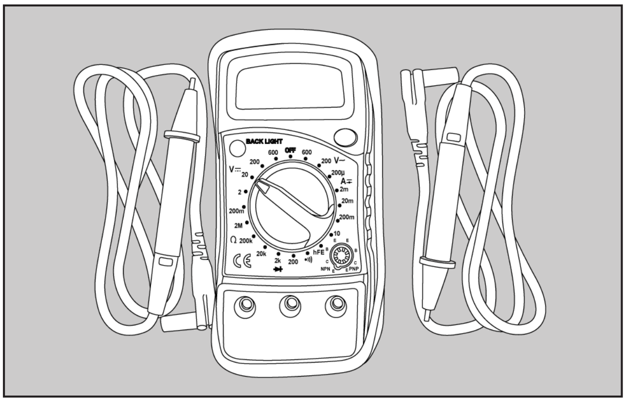
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.1 - Using Breakout Box method

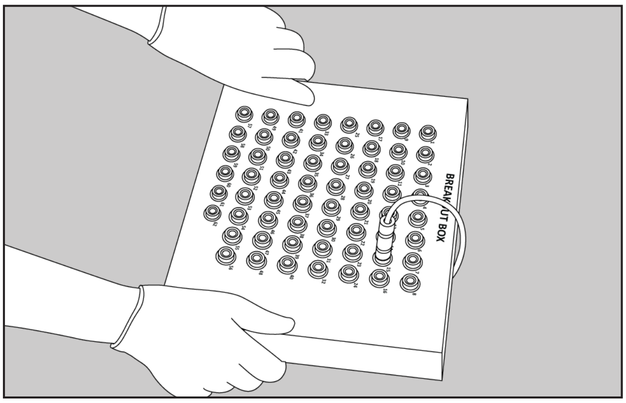
1.2 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

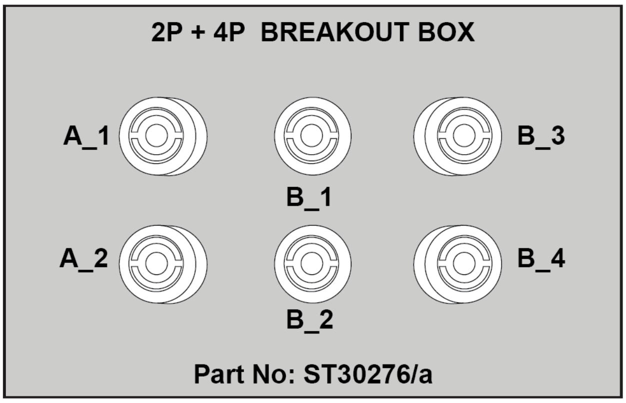
- **Tools Required**
- Multimeter (Universal)


BACK LIGHT
OFF

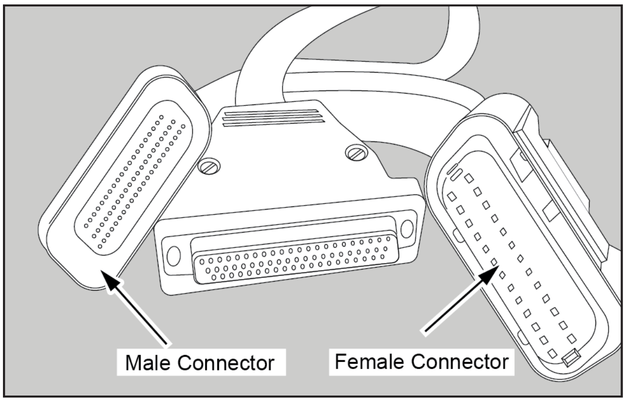
- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit


BREAKOUT BOX

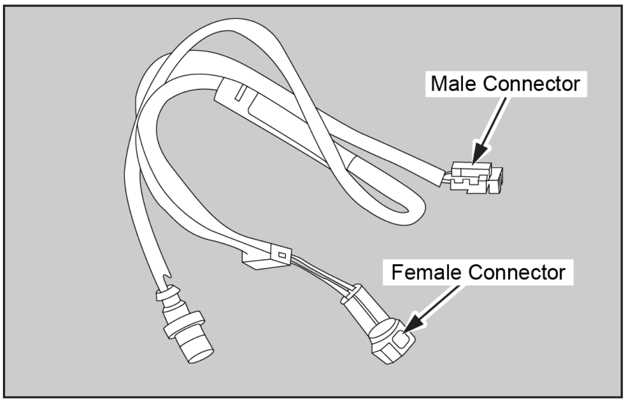
- Breakout Box (2P+4P Sensor Breakout box - ST30276/A) - 6 Pin kit


2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU Breakout Harness -ST ST30923/A

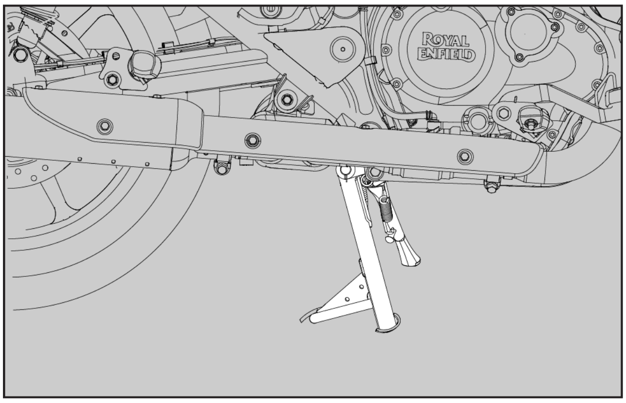

Male Connector
Female Connector

- EOT,Crank position, ignition coil -Sensor breakout box harness-2 pin ST30280/A

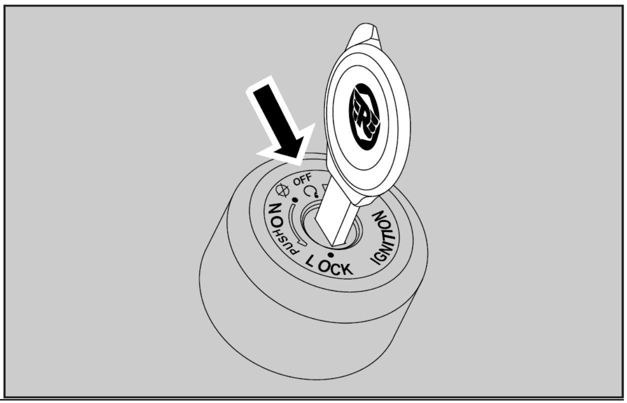

Male Connector
Female Connector

b. Pre-Checks:

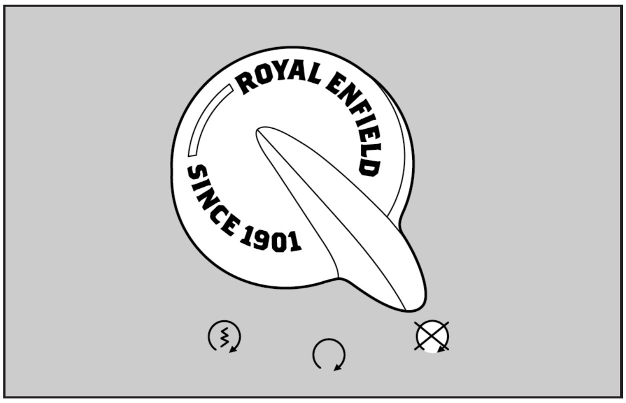
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less-Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**

⚠ CAUTION

- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU**

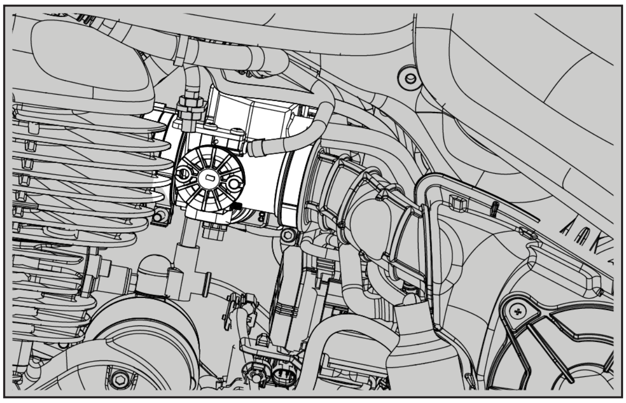
NOTE

- *Remove Left side panel to access the crank sensor coupler.*

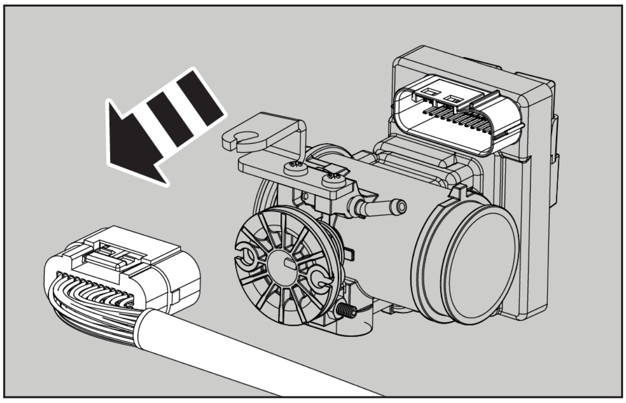
NOTE

- *Removal & refitment procedure of the left side panel is mentioned here as a hyperlink (exclusive service manual)*

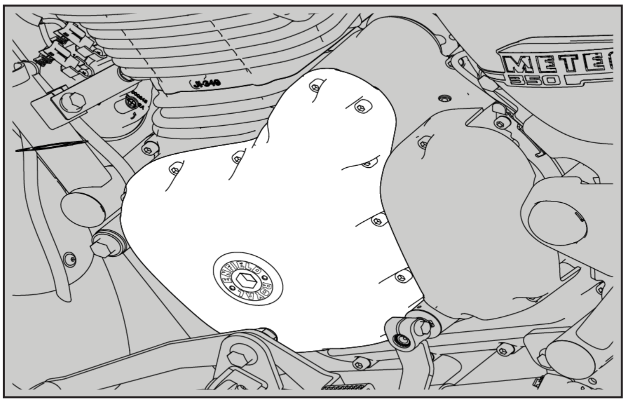
- ECU is located in the throttle body Assembly



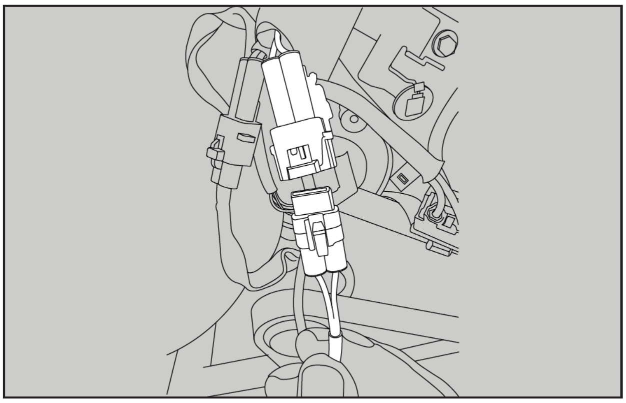
- Disconnect ECU from ECU coupler.



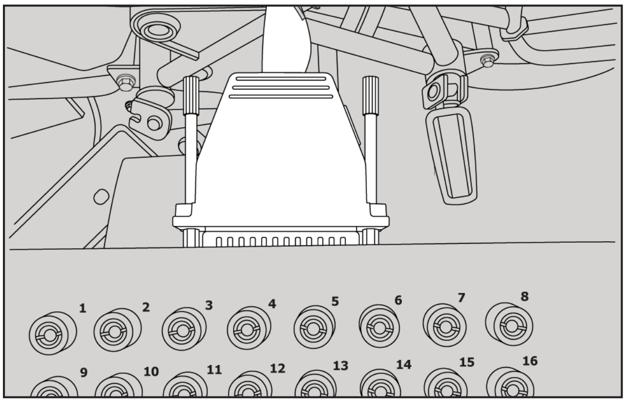
- Crank sensor is located on the Left side engine case



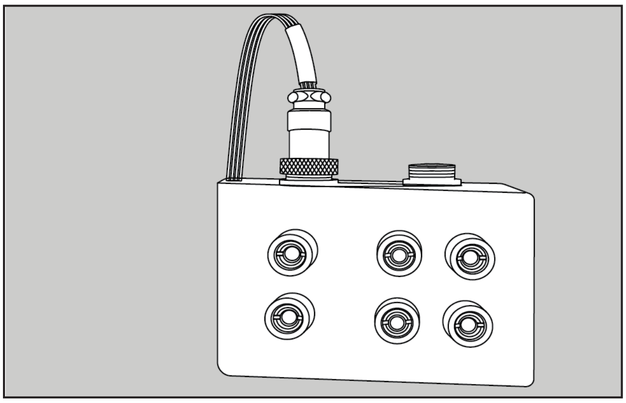
- Disconnect Crank position sensor from wiring harness coupler (black color coupler)



- Connect ECU breakout box (62 Pin) kit to using Breakout box Harness

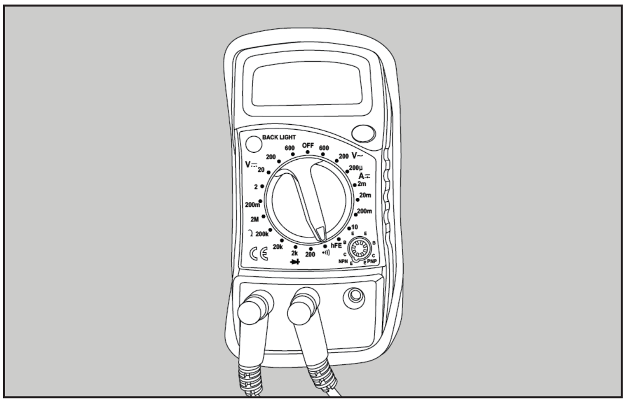


- Connect sensor Breakout Box (2P+4P Pin) to Crank position sensor breakout box harness kit

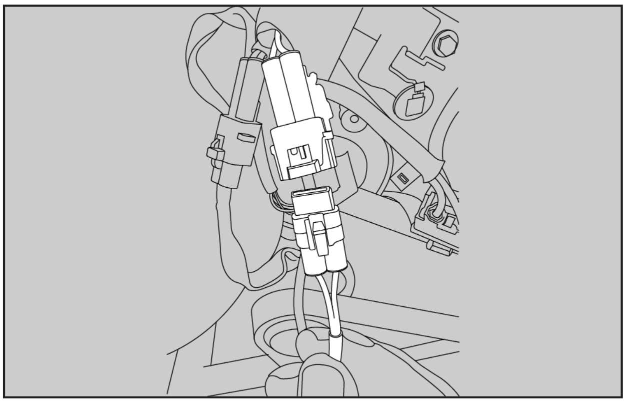


To Check Continuity of Wiring harness

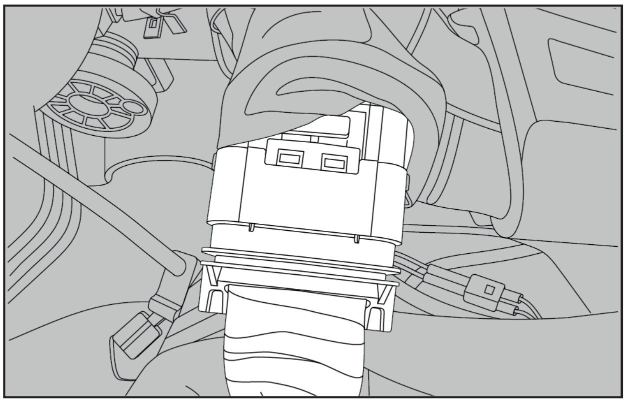
- Keep the multimeter in Continuity mode



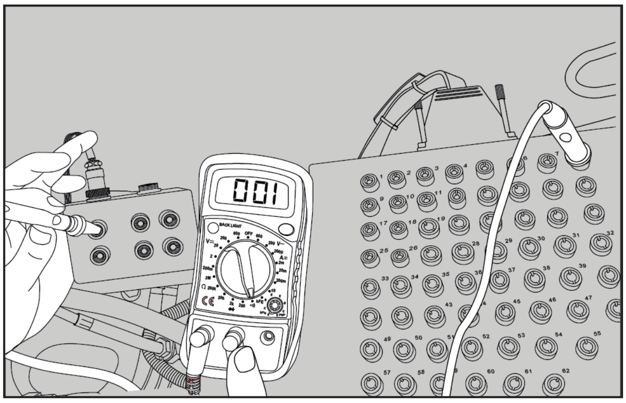
- Connect the crank position Sensor breakout box harness to Crank position sensor wiring harness coupler



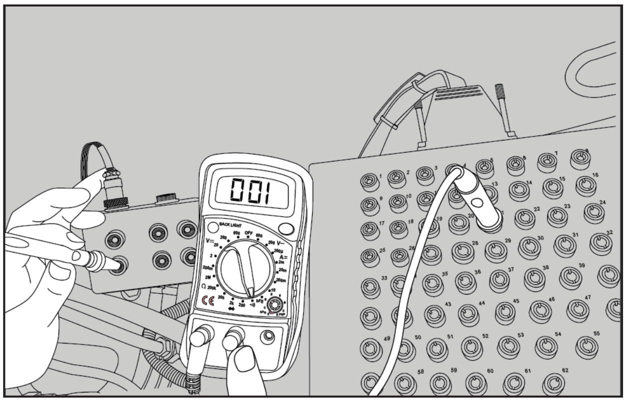
- Connect the male coupler of ECU breakout box harness to ECU wiring harness coupler



- Keep the positive probe of the multimeter in socket 1 of the sensor breakout box and negative probe in socket 8 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

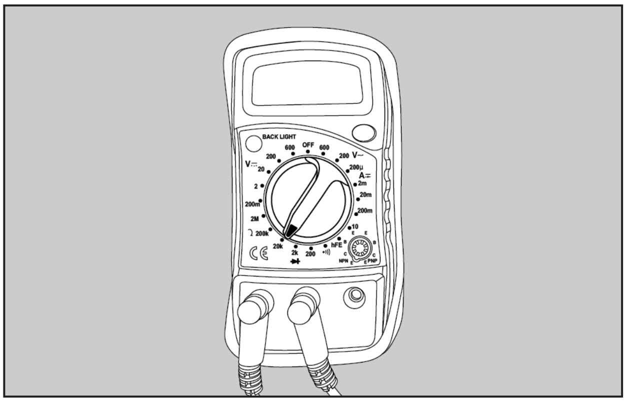


- Keep the positive probe of the multimeter in socket 2 of the sensor breakout box and negative probe in socket 21 of the ECU breakout box. Check for continuity (Beep sound from the multimeter)

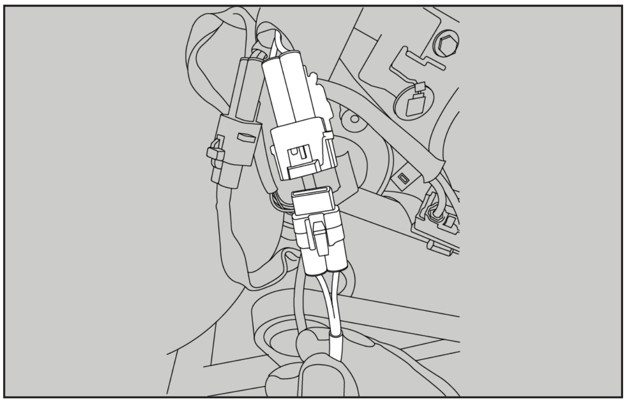


To Check the Resistance

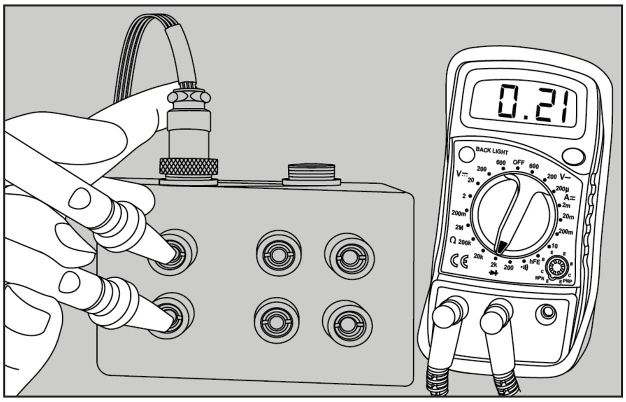
- Keep the multimeter in Resistance mode (200 ohms)



- Connect the Crank position sensor breakout box harness to the Crank position sensor coupler



- To check the Resistance value of the Crank position sensor, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 of the Sensor breakout box The resistance value is to be 205 to 225 Ohms @ 25+5°c



VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. DECISION POINT:

- If continuity is not available you may please replace the Wiring harness
- If the resistance is not within the specified limit (205 to225 Ohms), you replace with the Stator coil
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

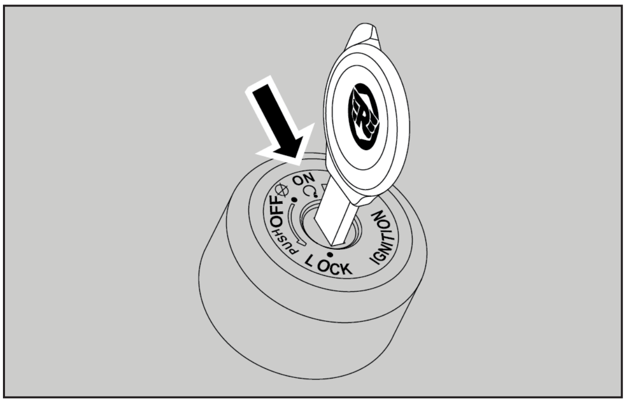
It is recommended to replace the sensor /ECU / Wiring harness as per the advice from Royal Enfield only.

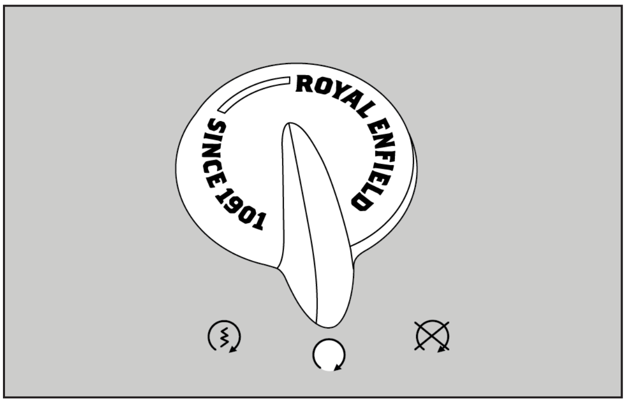
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

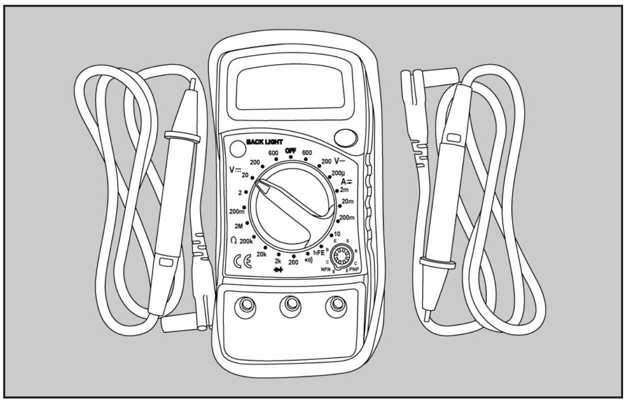
1.3. TEST LEAD WIRE METHOD:

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump-starting, etc.**

Tools Required

- Multimeter (Universal)

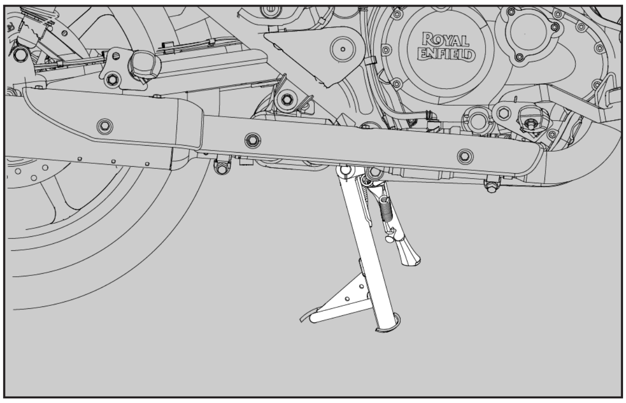


- Test lead wire (90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler
- Refer Chart for Color identification of Pins - Hyperlink will be given here to the chart

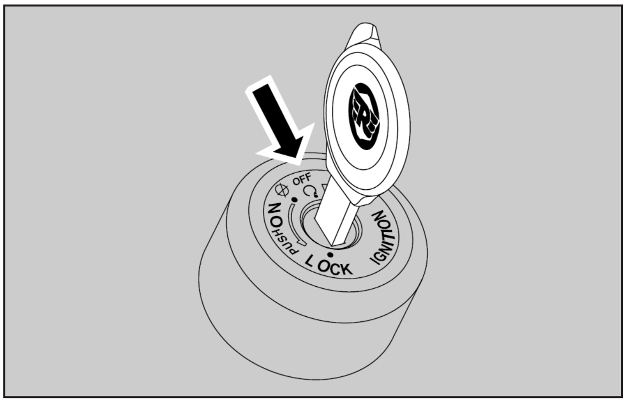
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

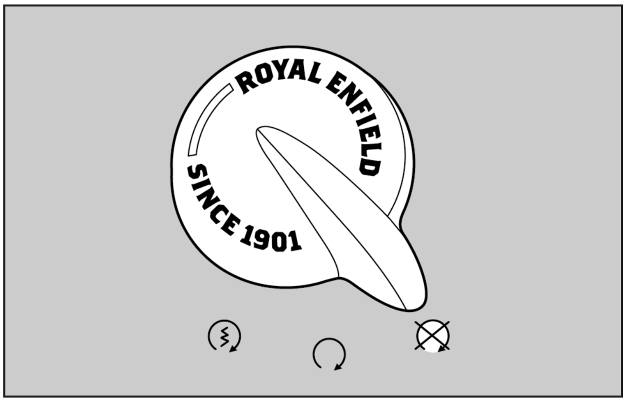
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

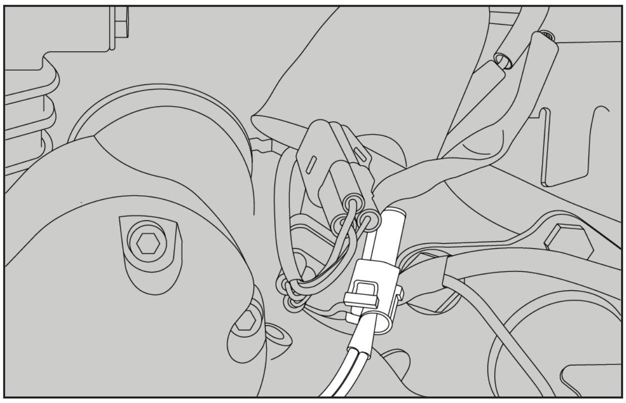


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

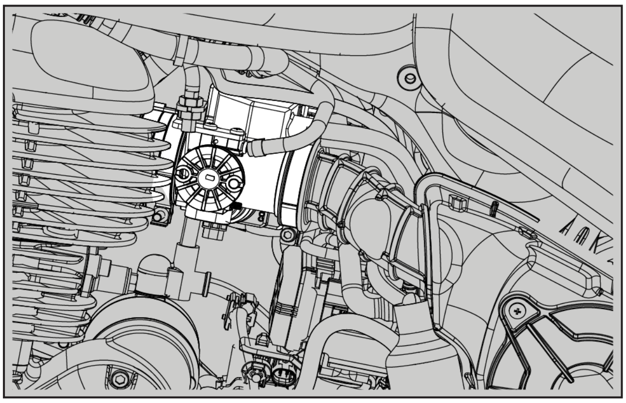
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Secondary air valve.*

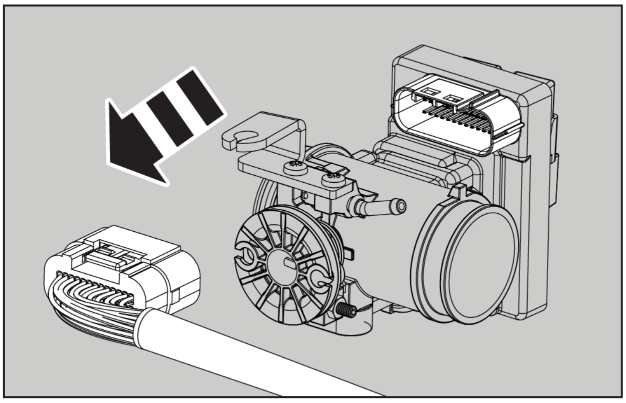
NOTE

- *Removal & refitment of of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

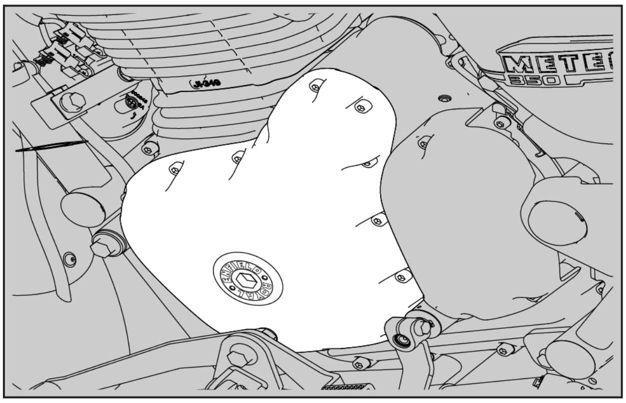
- ECU is located on the throttle body assembly



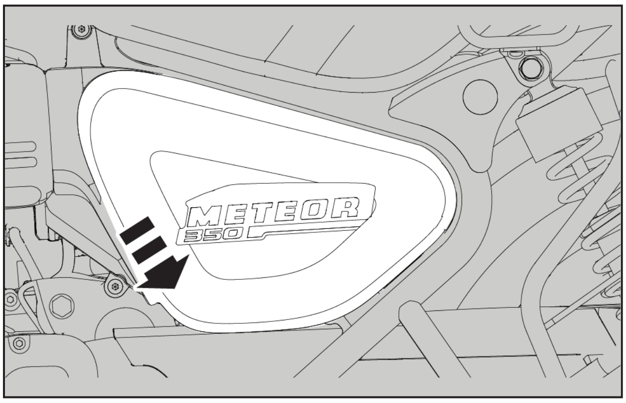
- Disconnect ECU from ECU wiring harness coupler

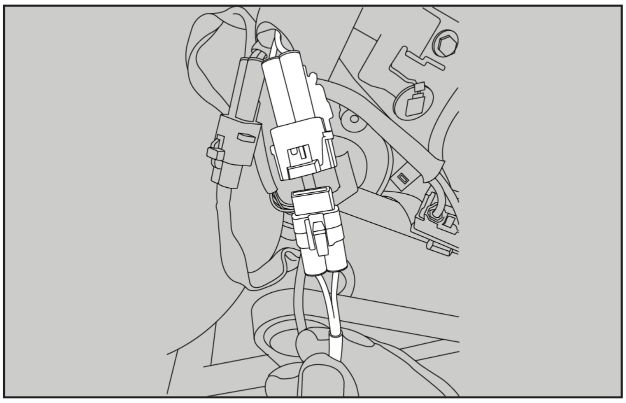


- Crank sensor coupler is located inside RH side panel bottom end



- Disconnect the Crank position sensor coupler (Black coupler).

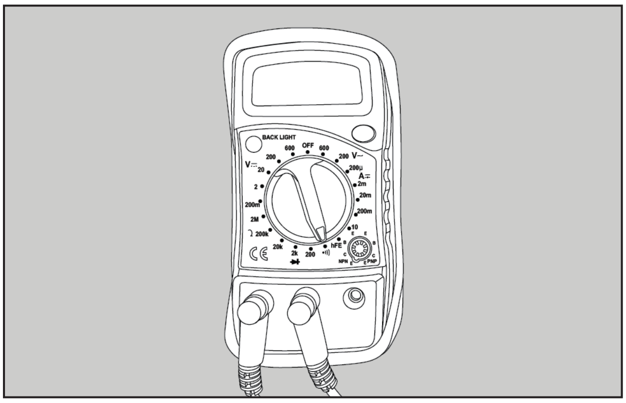




To check the Continuity of the wiring harness

STEP 1

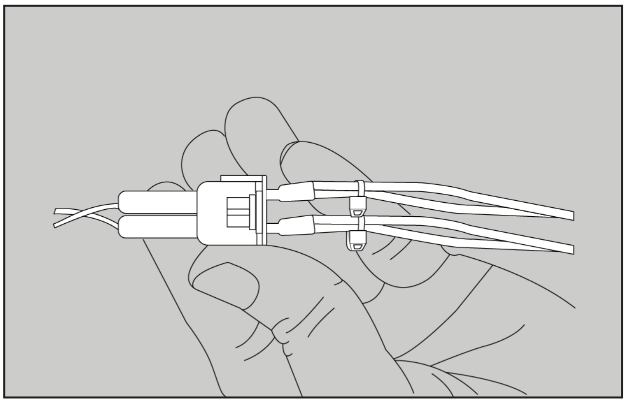
- Keep the multimeter in continuity mode.



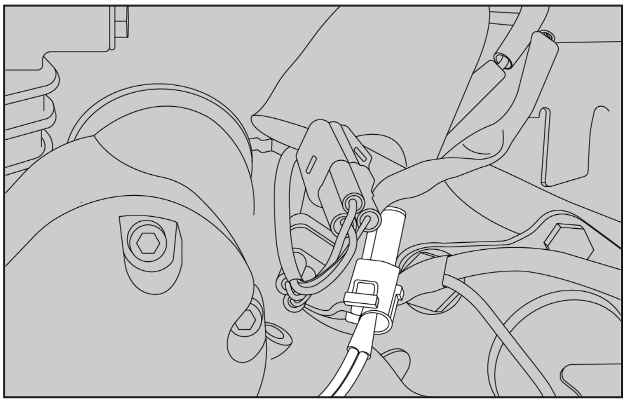
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor wiring harness coupler.

90 series (Orange Color) test lead wire with the black tag in Pin 1 of Crank position sensor wiring harness socket

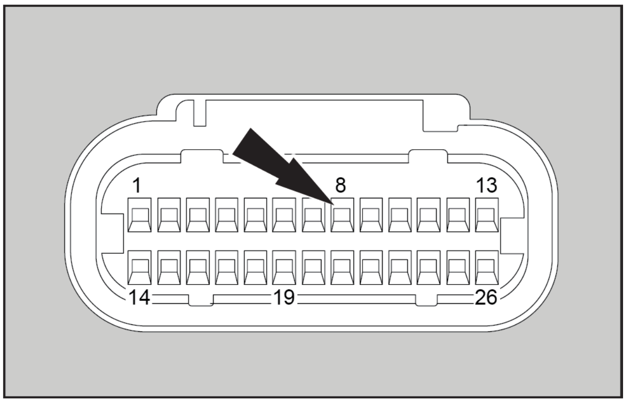
90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor wiring harness socket



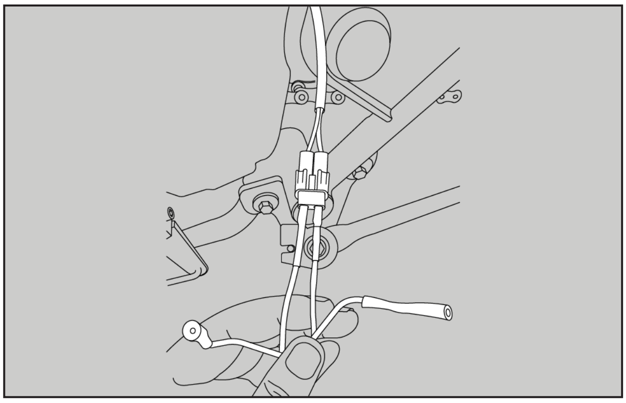
- Keep the multimeter positive probe to Pin 1 (90 series test lead wire with black tag) of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with black tag to pin 9 of the ECU wiring harness coupler.

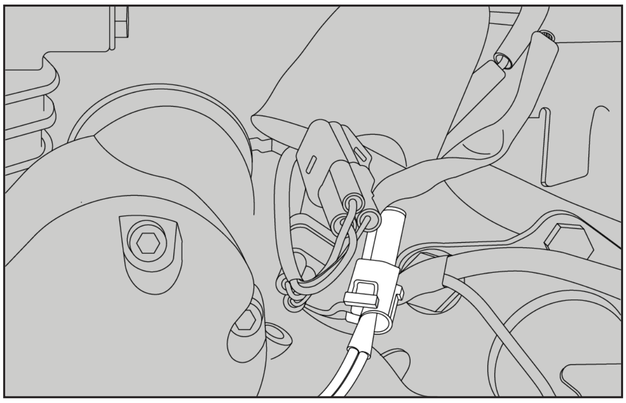


- Keep the multimeter negative probe in Pin 8 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

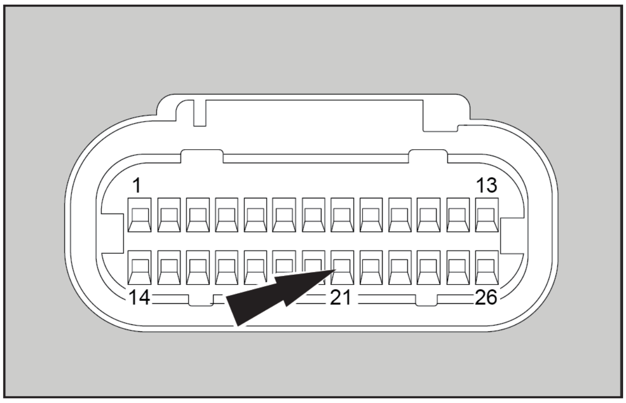


STEP 2

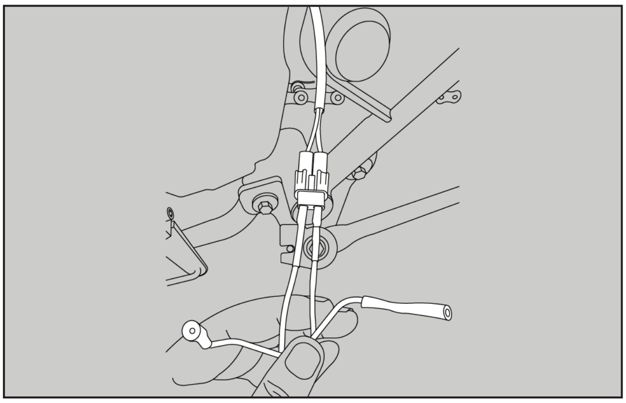
- Keep the multimeter positive probe to Pin 2 of 90 series (Orange Color) test lead wire with red tag of the Crank position sensor wiring harness coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 21 of the ECU wiring harness coupler



- Keep the multimeter negative probe in Pin 21 of ECU wiring harness coupler (Test lead wire 40 series yellow color). Check for continuity (Beep sound from the multimeter)

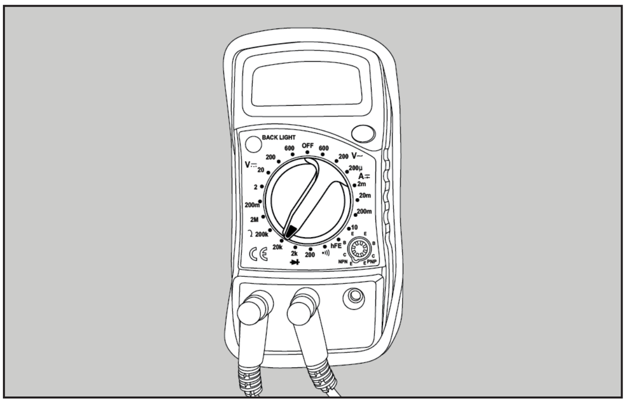


⚠ CAUTION

Please ensure while disconnecting and connecting the test lead wire to the couplers, ensure there is no bend or damage.

To check the Resistance

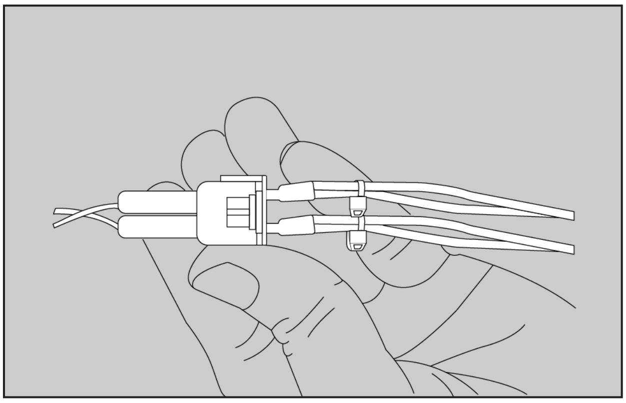
- Keep the multimeter in Resistance mode (2K ohms)



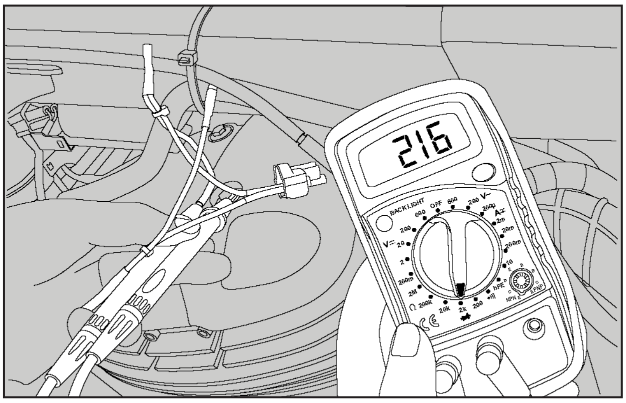
- Connect the Test lead wire 90 series (orange color) in the Crank position sensor coupler.

90 series (orange color) test lead wire with the black tag in Pin 1 of Crank position sensor coupler

90 series (orange color) test lead wire with the red tag in Pin 2 of Crank position sensor coupler



- Keep the multimeter positive probe in Pin 1 (90 series test lead wire with black tag) and negative probe in Pin 2 (90 series test lead wire with red tag). Resistance value to be 205 to 225 Ohms.



⚠ CAUTION

Please ensure while disconnecting and connecting test lead wire to the couplers, ensure there is no bend or damage.

VISUAL CHECK:

1. Damage/missing of sensing pips and burrs in sensing pip in the Rotor
2. Uneven Crank position sensor coil surface
3. In the assembled condition, the improper air gap between crank position sensor coil and pips in the rotor

d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (205 – 225 Ohms), you replace it with the Stator coil.
- If continuity is available and crank sensor resistance is as per specification you have to replace the ECU.

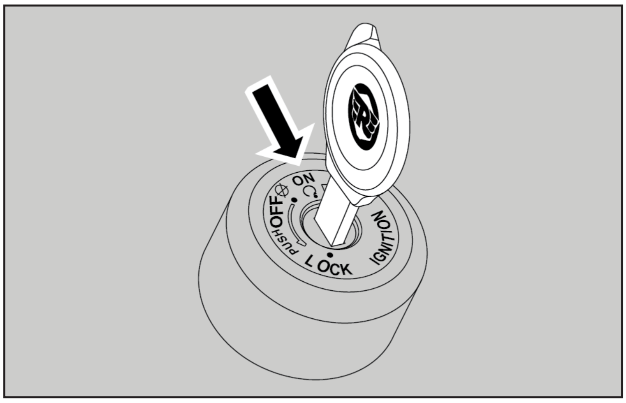
It is recommended to replace the sensor /ECU / wiring harness as per the advice from Royal Enfield only.

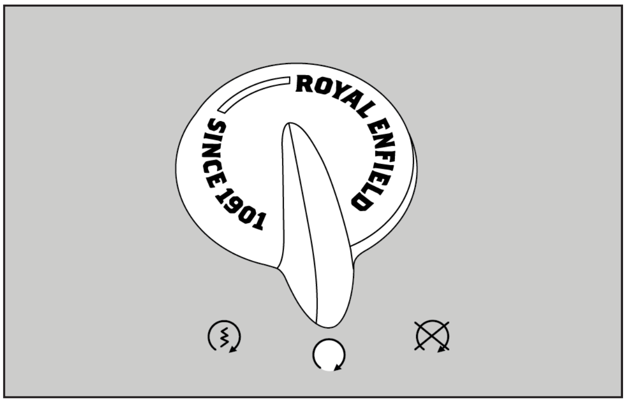
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure normal running condition of the motorcycle.

P0629 - FUEL PUMP
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0629	Fuel pump	Electric Fuel Pump circuit high

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0629

Type of error : Fuel pump Circuit High

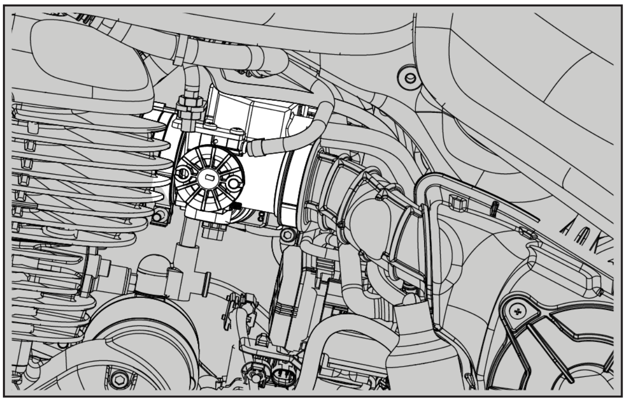
(i) Information : Fuel Pump circuit fault / Fuel pump internal fault

b.Preliminary Checks (Basic Check Points):

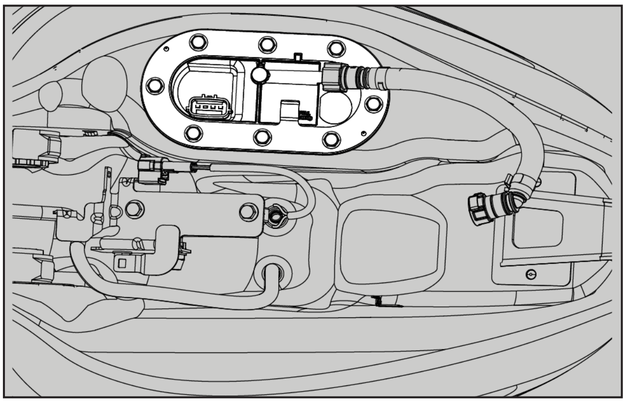
⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

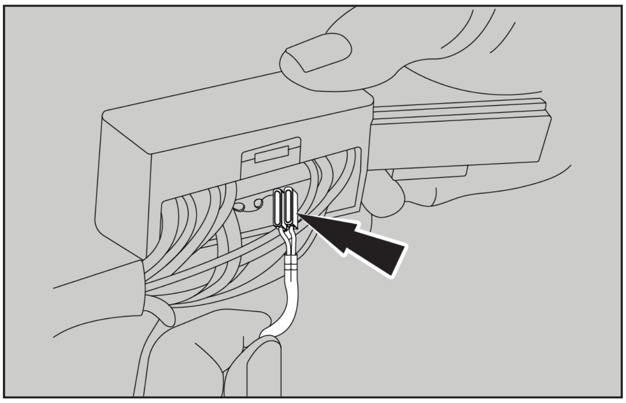
- ECU coupler is located in the Throttle body Assembly



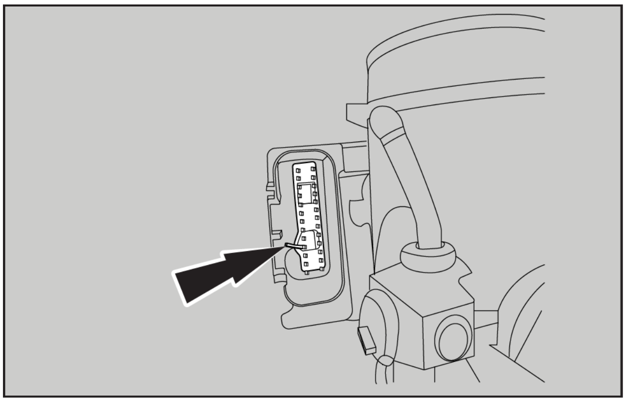
- Fuel pump coupler is located beneath the fuel tank



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Fuel Pump couplers, if found change the Fuel Pump or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

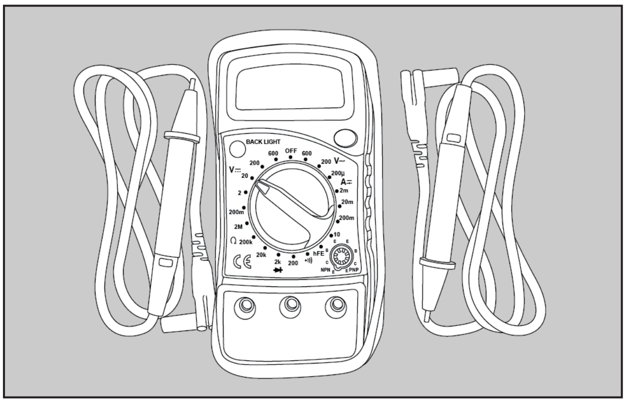
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

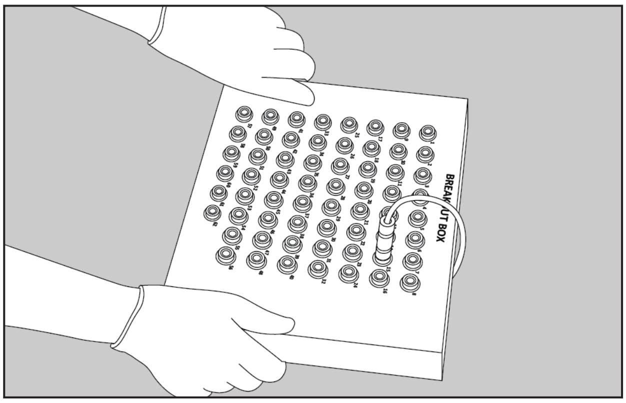
1.3 - Using Test lead wire method

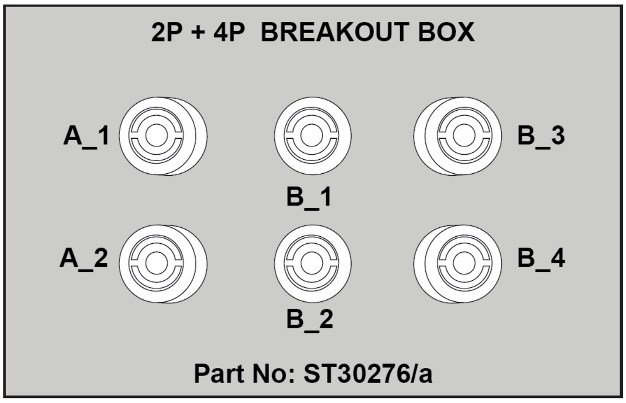
1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)



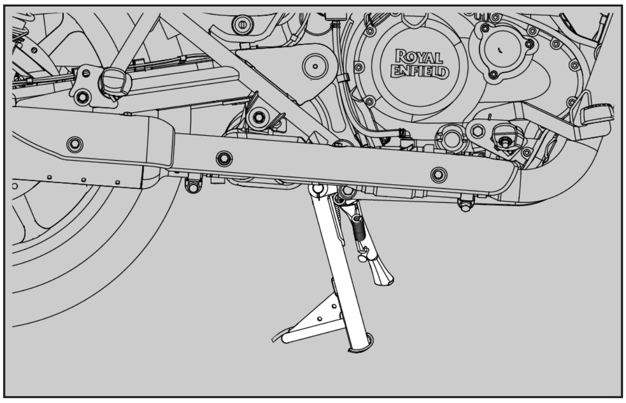
- Breakout Box (26 PIN ECU ST 30923/A & 62 P ECU Breakout Box ST 30275/A)


BREAKOUT BOX

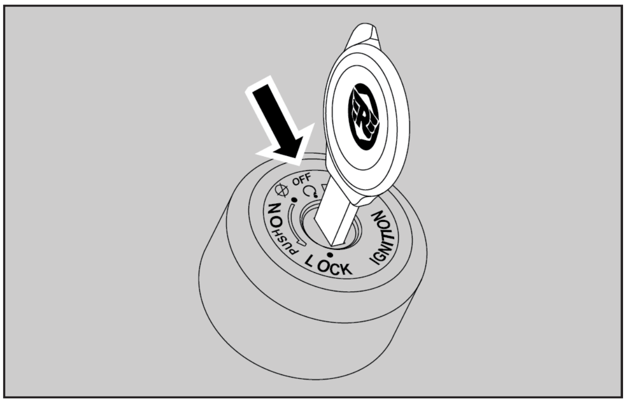

2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

b. Pre-Checks:

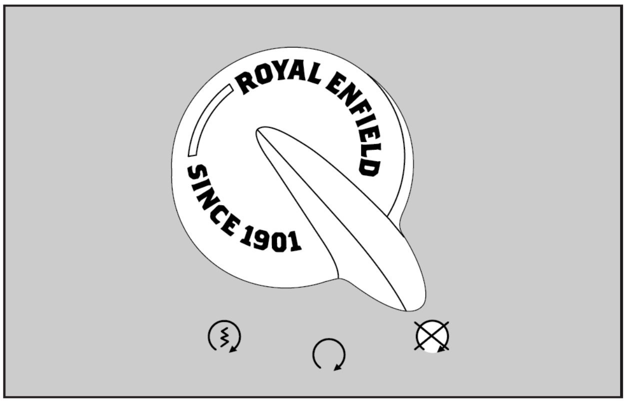
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition

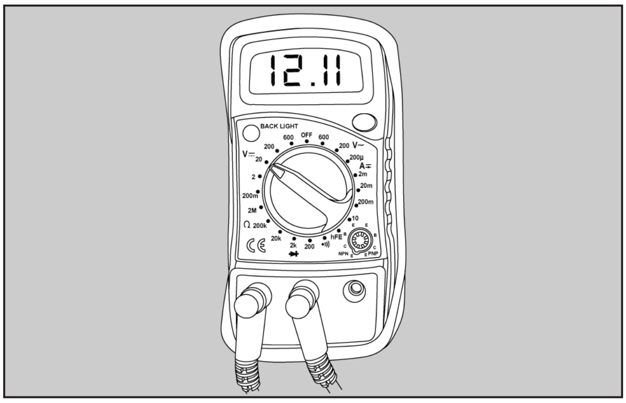

OFF
PUSH ON
LOCK
IGNITION

- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V
- (If the battery voltage is less - Please Charge the battery sufficiently to make it to the required voltage of 12 V and still voltage found to be less, you may replace with new battery)

Please ensure a healthy battery which is more than 12V to perform the further below listed activity.


12.11
BACK LIGHT
OFF

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers**

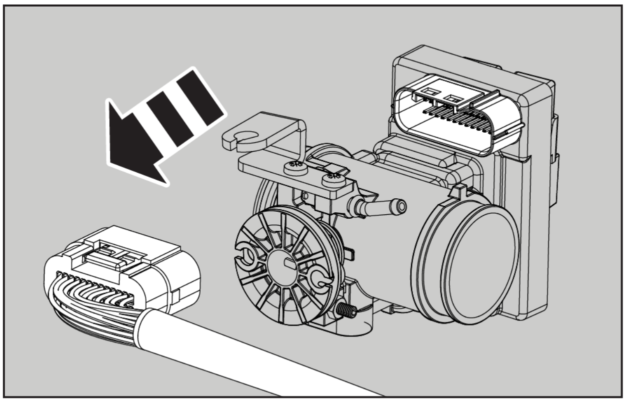
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Fuel pump coupler*

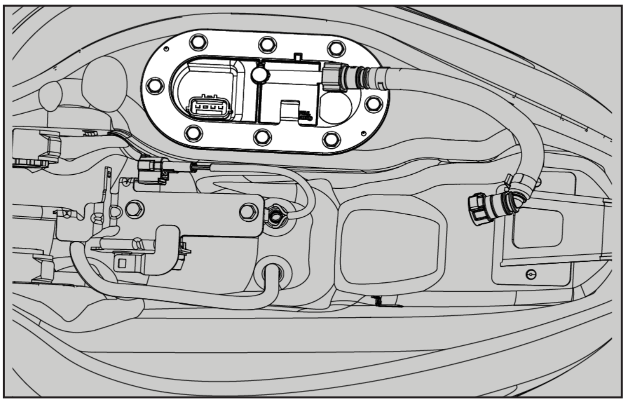
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

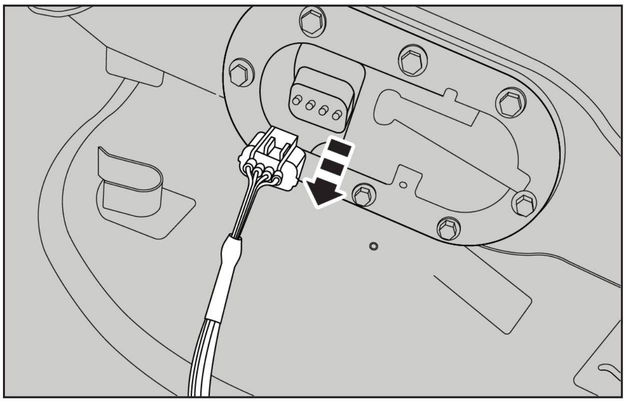
- Disconnect ECU coupler.

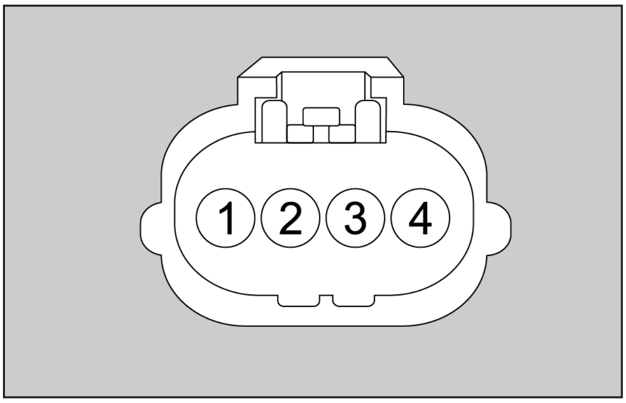


- Fuel pump is located in the fuel tank

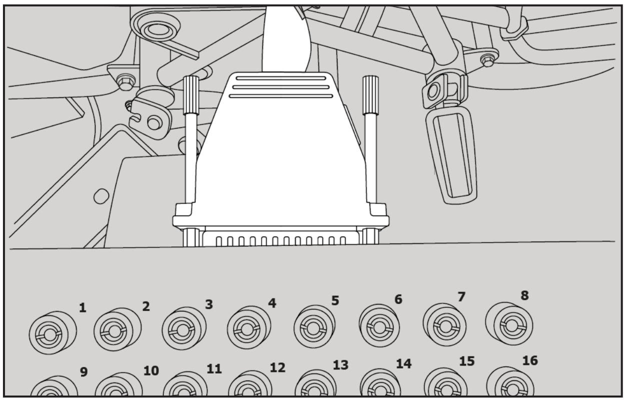


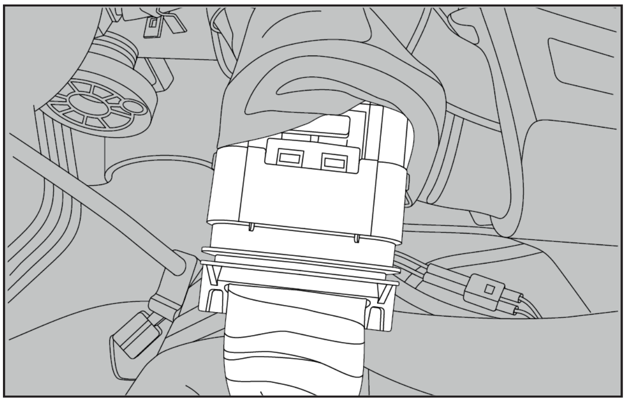
- Disconnect Fuel pump coupler



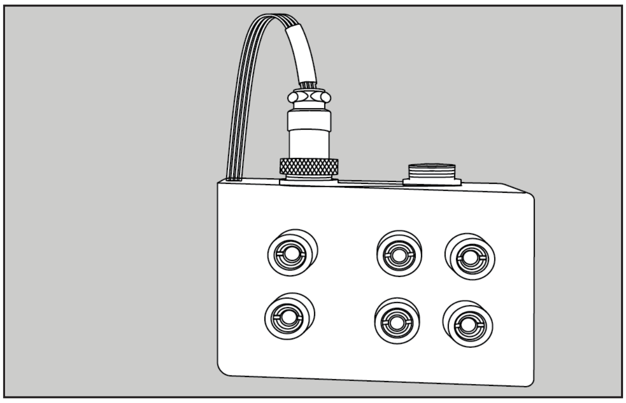


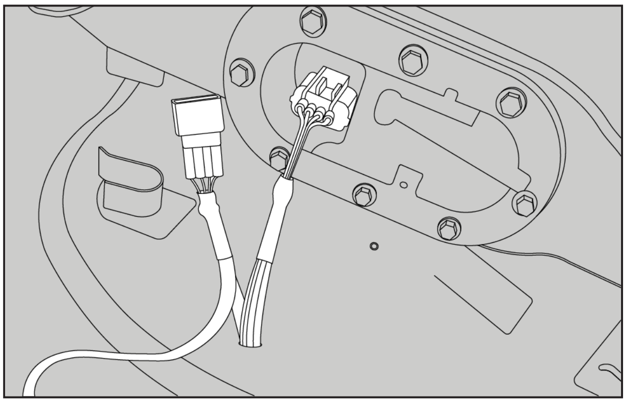
- Connect ECU and Breakout box Harness (62 Pin).



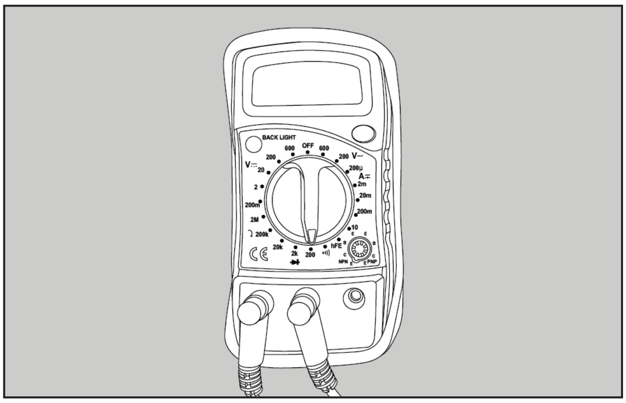


- Connect Fuel pump connector cable to Breakout Box (6 Pin)

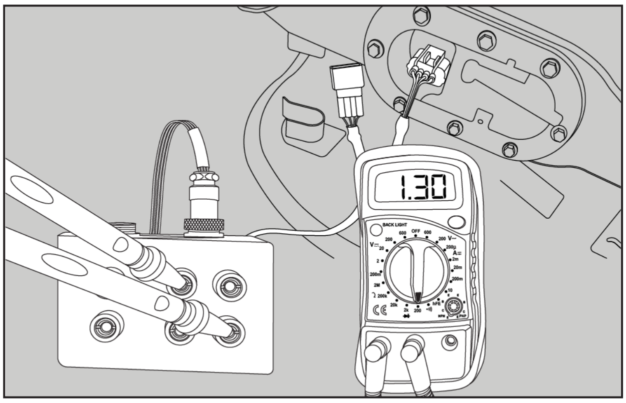




- Keep the multimeter in Resistance mode (200 Ohms)

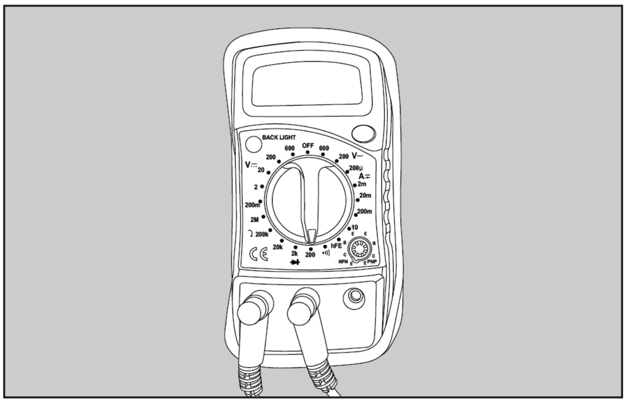


- To check the Resistance value of fuel Pump, connect the multimeter in Pin 1 and Pin 4. The resistance value is to be 1.0 – 1.8 Ohms

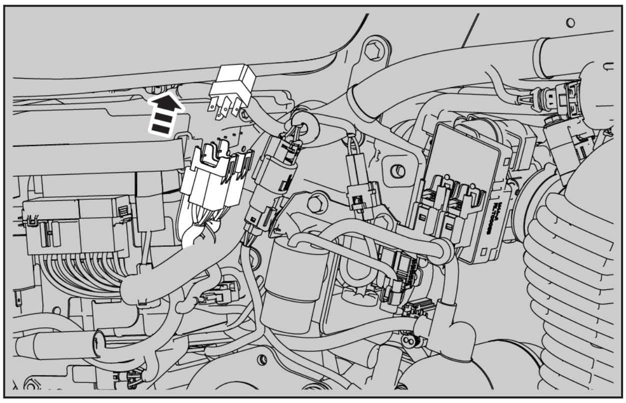


To check the Resistance of Fuel pump relay coil

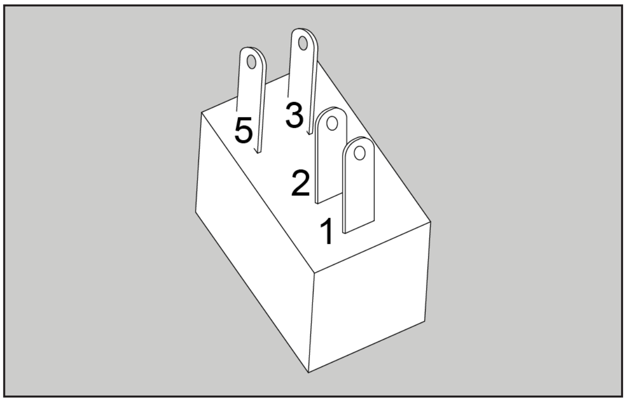
- Keep the Multimeter in Resistance mode 200 Ohm

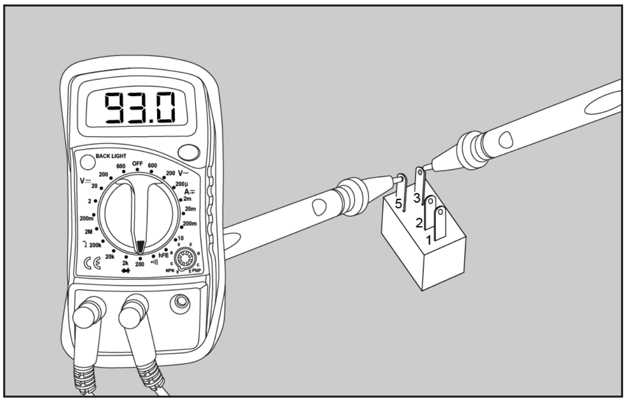


- Disconnect fuel pump relay located inside right-side panel

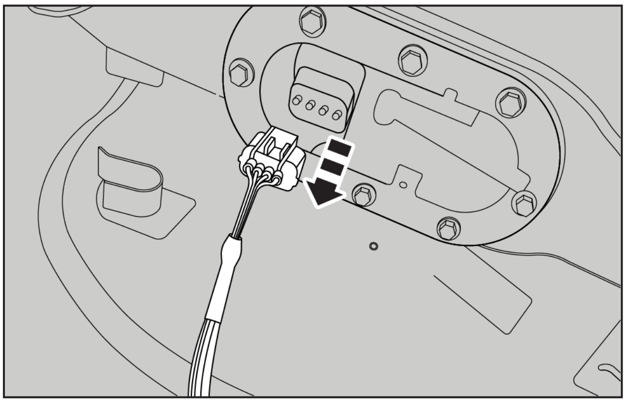


- Using a multimeter, check the Resistance of Fuel pump relay coil between pin 3 and pin 5. Resistance should be between 82Ω to 102Ω @ 30 5°C



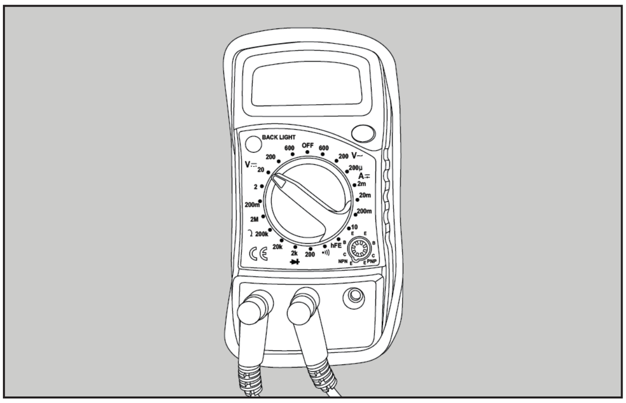


- Disconnect the cable from the Fuel pump end and connect it to the wiring harness end using the other coupler present in the harness.

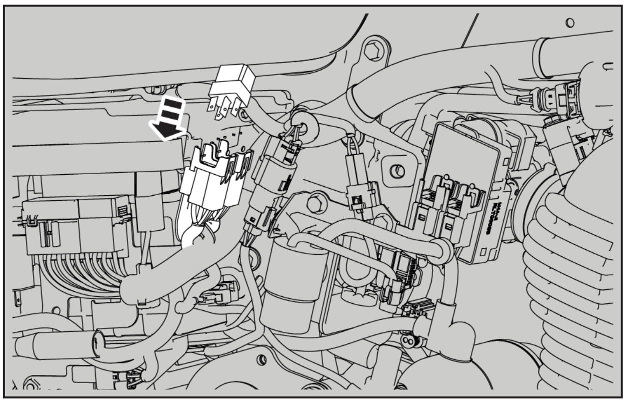


To check the voltage at ECU point (input voltage check)

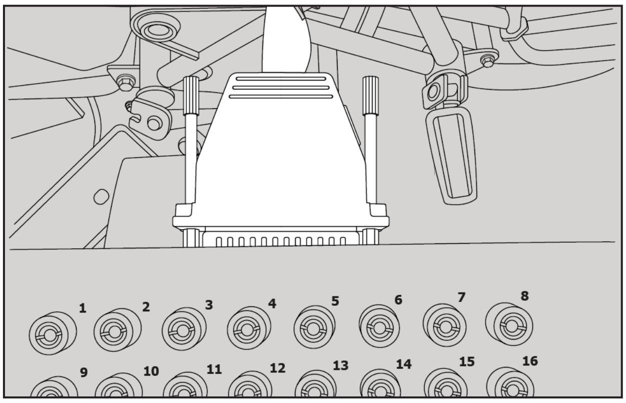
- Keep the Multimeter in Voltage mode 20 V.

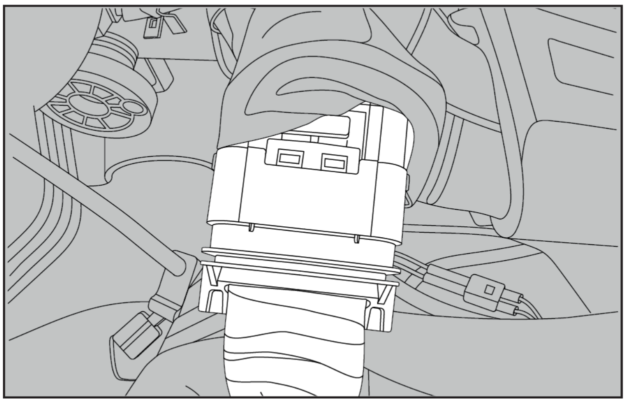


- Place the fuel pump relay in the corresponding Fuel pump relay holder

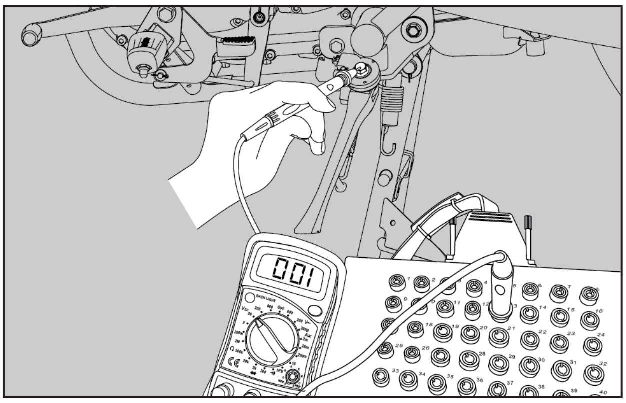


- Connect the ECU breakout box to ECU and wiring harness

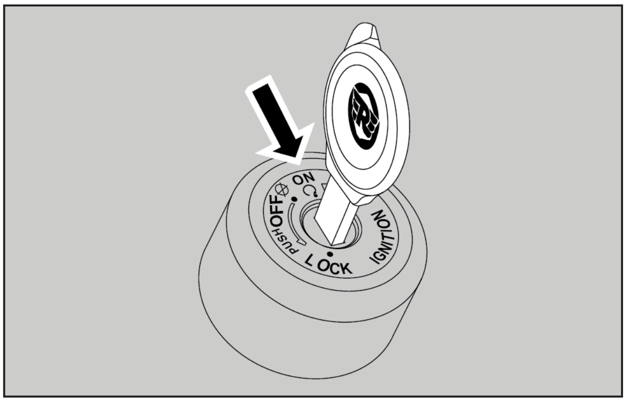


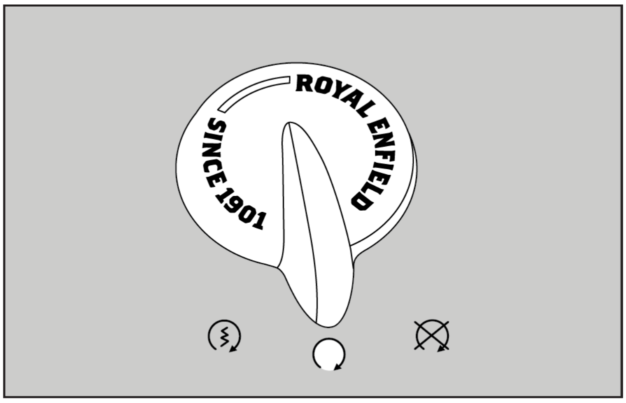


- To check input voltage at ECU point, place the positive probe of the Multimeter in socket 13 of the ECU breakout box and place the negative probe of the Multimeter to body ground or Battery Negative or Socket 1 of the ECU breakout box.

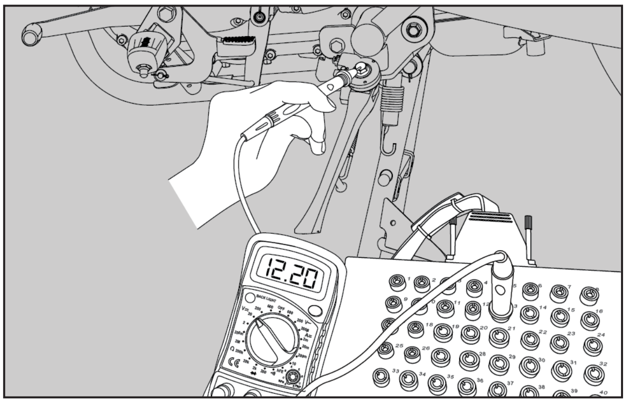


- Turn “ON” the ignition and kill switch


ON
OFF
PUSH
LOCK
IGNITION

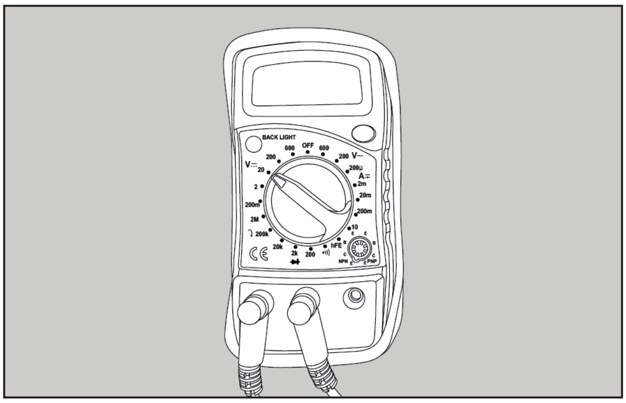

ROYAL ENFIELD
SINCE 1901

- Check the voltage, it should be 12 V in the Multimeter.

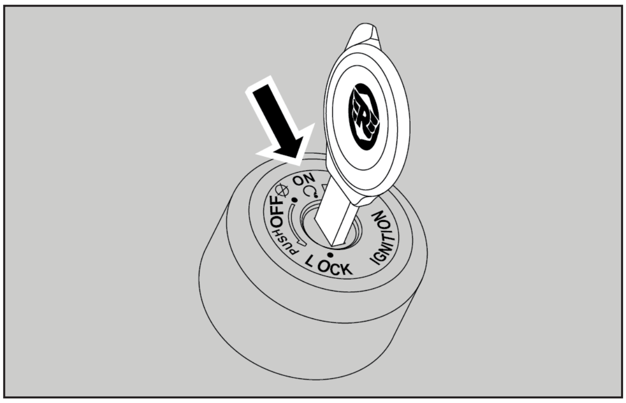


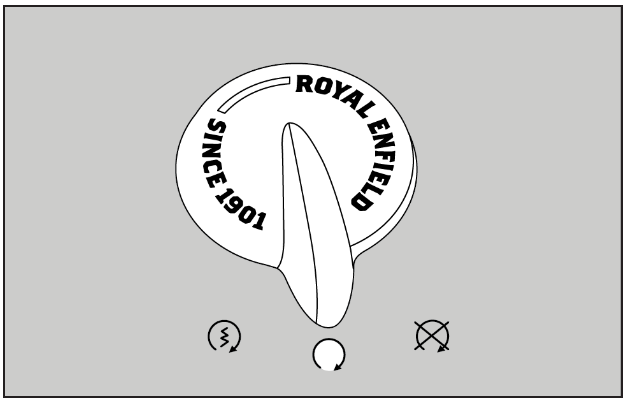
To check the System Voltage (output voltage check)

- Keep the Multimeter in Voltage mode (20 V)

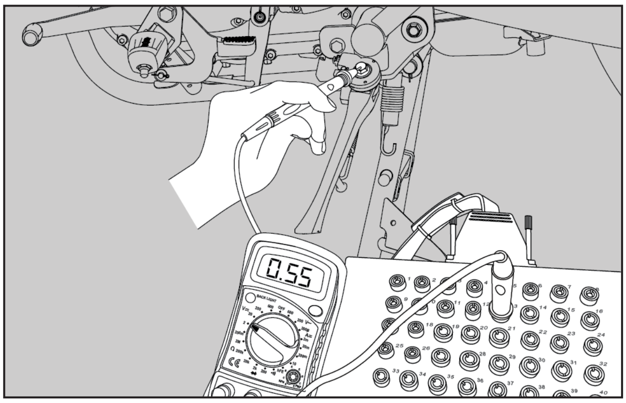

BACK LIGHT
OFF
V
A
hFE

- Turn ‘ON” the Ignition switch, Kill switch and start the vehicle


ON
OFF
PUSH
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

- Connect across socket 13 of the ECU breakout box and body ground or Battery Negative or Socket 1 of the ECU breakout box. Check the Voltage it should be 0.55V.



d. DECISION POINT:

- If the resistance is not within the specified limit (82-102 Ohms @30+5°C), you replace it with the fuel pump relay.
- If the output voltage is 0V and the fuel pump is not priming (when trying to start the engine) and if continuity is available then you may replace the ECU.
- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.

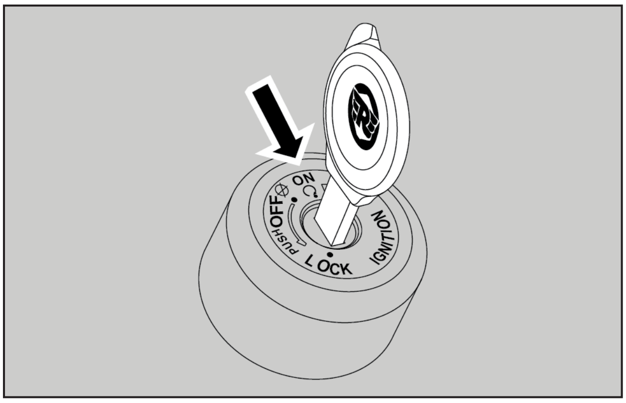
It is recommended to replace the fuel pump relay /ECU / Wiring Harness as per the advice from Royal Enfield only

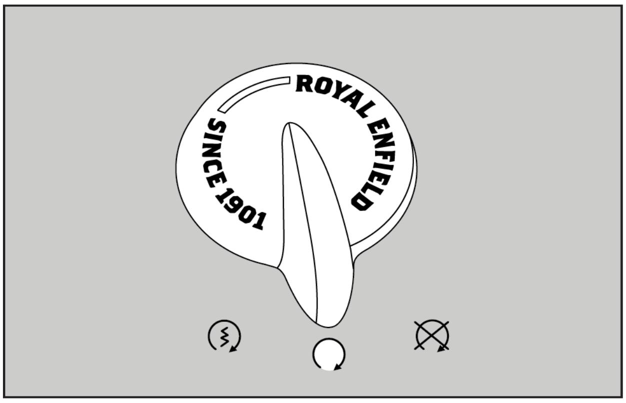
DTC Clearing Procedure:

⚠ CAUTION

- **With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same**

- Ensure Ignition & Kill Switch is in "ON" Position





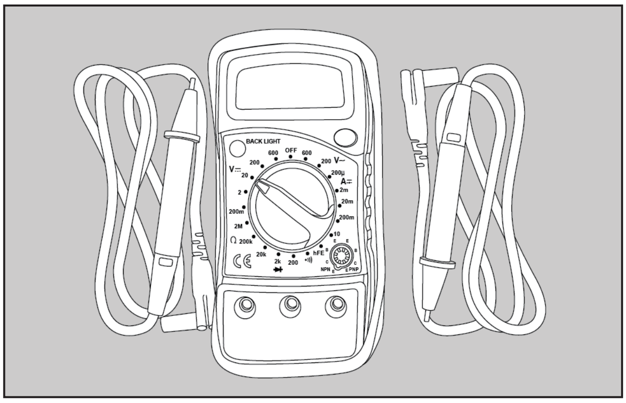
- If fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

- **Tools Required**
- Multimeter (Universal)

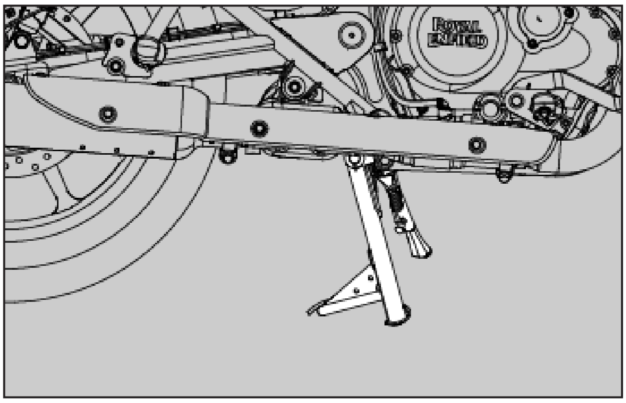


- Test lead wire (90 series - Orange color)
- Test lead wire (40 Series - Yellow color)
- Refer Chart for Color identification of Pins

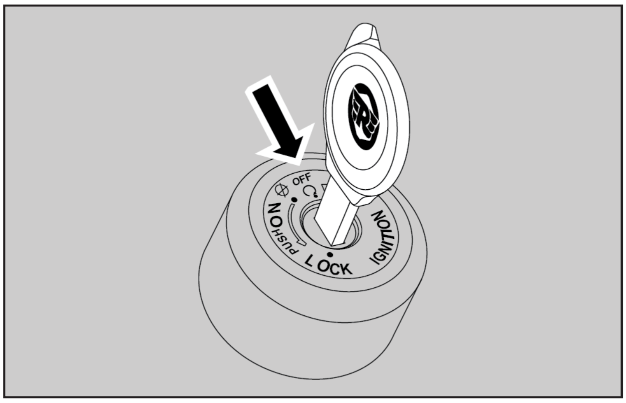
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

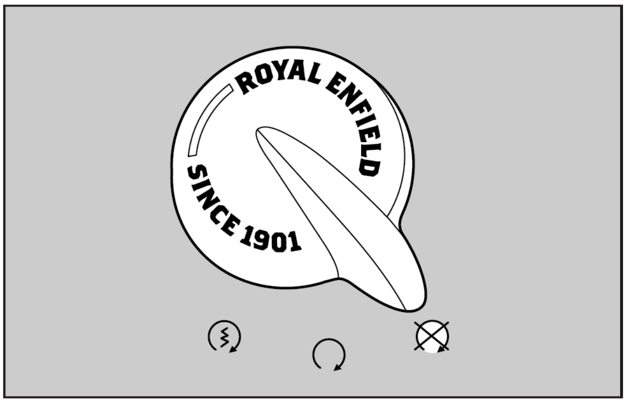
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

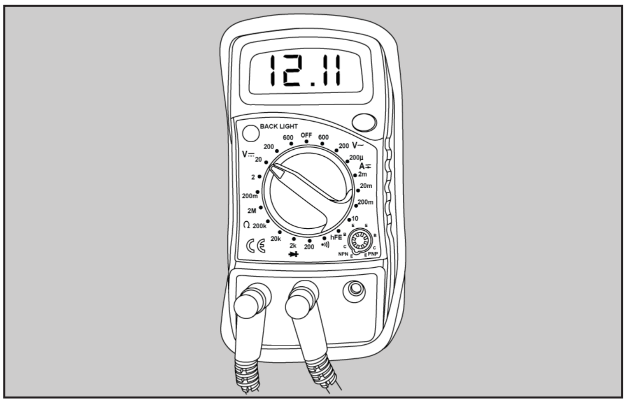


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

C. DIAGNOSTICS:

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

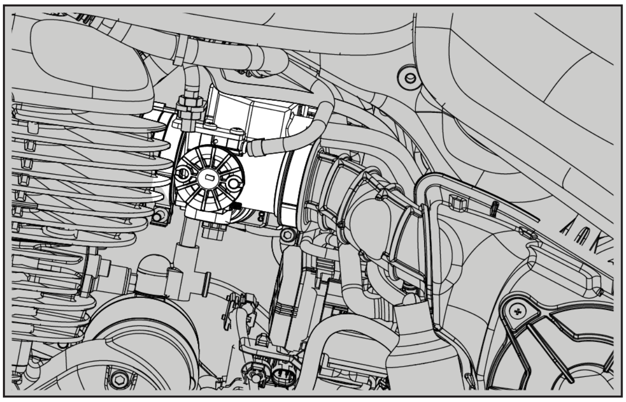
NOTE

- *Please remove the fuel tank from the motorcycle to access the fuel pump coupler*

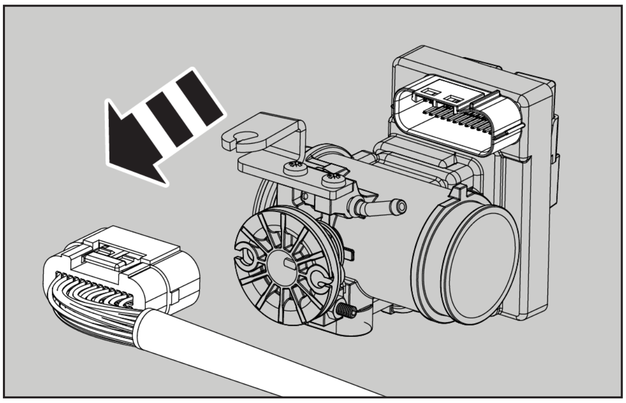
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

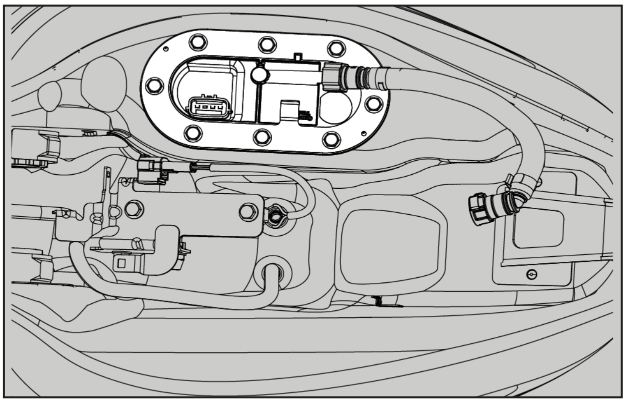
- ECU is located on the throttle body assembly



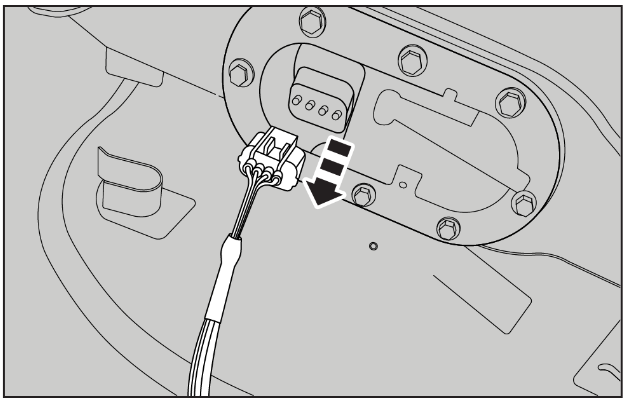
- Disconnect the ECU wiring harness coupler from ECU

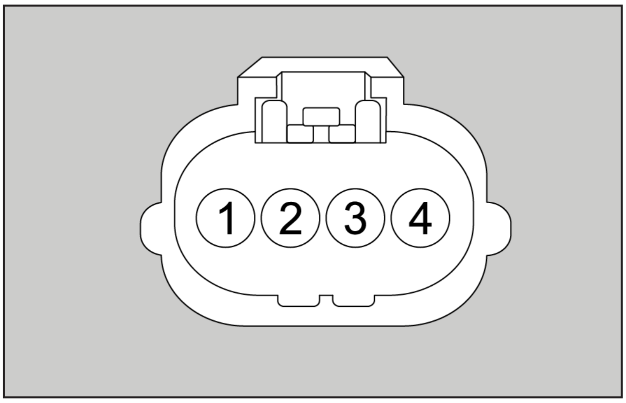


- Fuel pump is located on the fuel tank



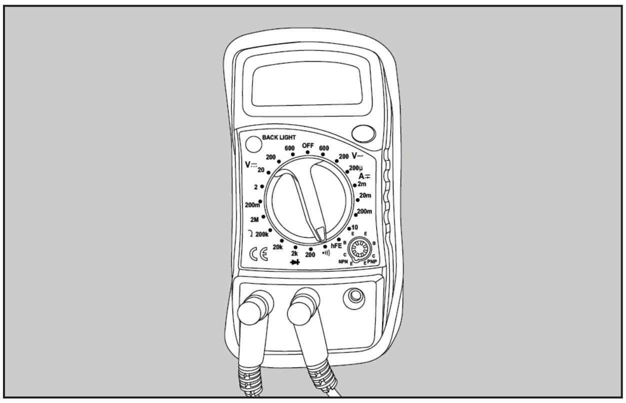
- Disconnect the fuel pump coupler.



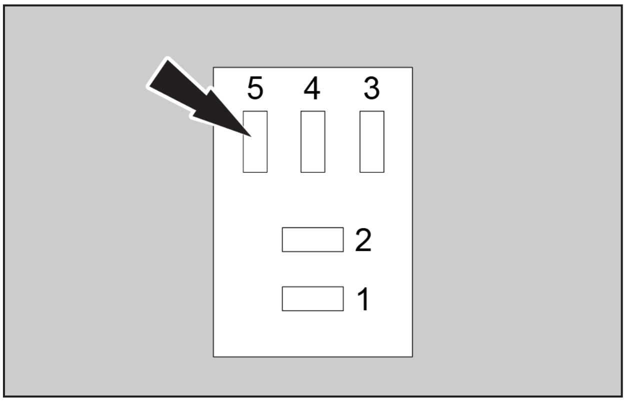


To check Continuity of the Wiring Harness

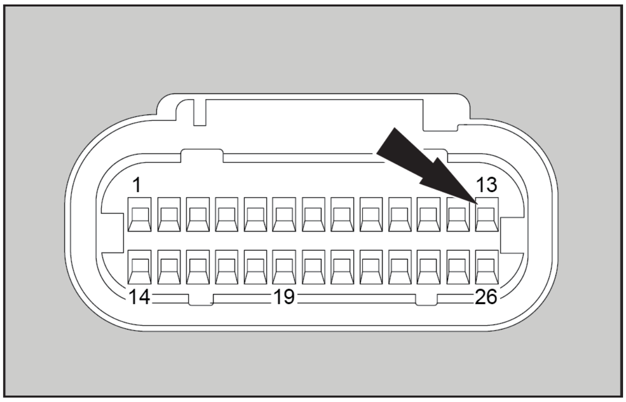
- Keep the multimeter in continuity mode.



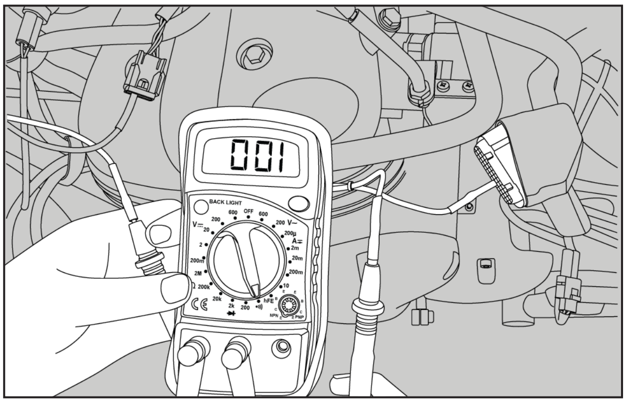
- Using multimeter check pin 5 of the fuel pump relay socket



- Connect 40 series (yellow color) test lead wire with the black tag to pin 13 of the ECU wiring harness coupler.

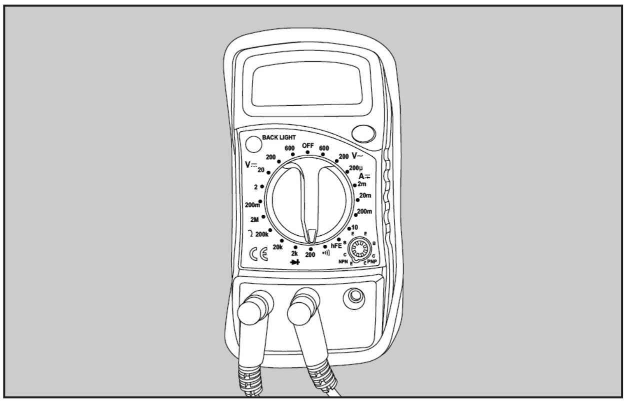


- Check for continuity (Beep sound from multimeter)

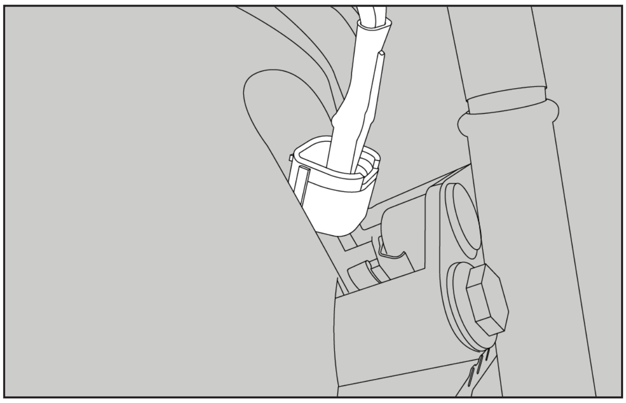


To check the Resistance of Fuel pump

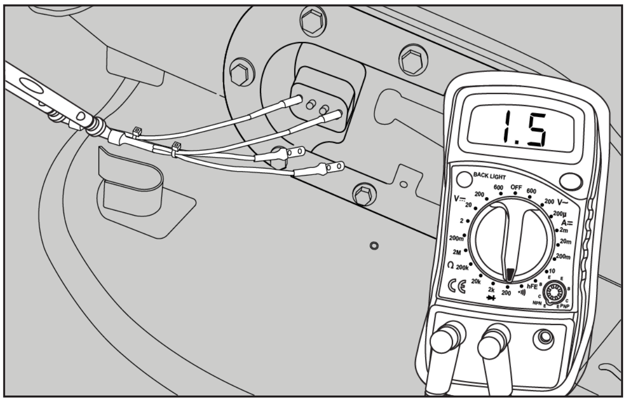
- Keep the multimeter in Resistance mode



- Connect 90 series (Orange black color) Test lead wire with the black tag in Pin 1 and connect 90 series (orange color) test lead wire with the green tag in pin 4 of fuel pump coupler.

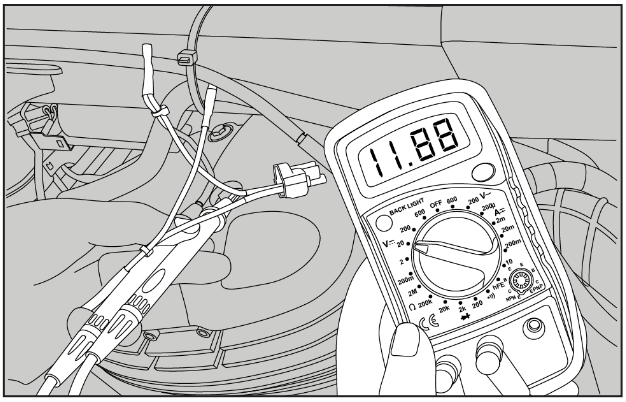


- Connect the multimeter positive probe in pin 1 and negative probe in pin 4. The resistance value is to be 1.0 – 1.8 Ohms



To check the Voltage

- Connect the multimeter positive probe to pin 1 and negative to body ground in the wiring harness coupler and turn "ON" the ignition. Check the voltage and it should be 12 V in the multimeter



d. Decision Point:

- If the resistance is not within the specified limit (1.0 to 1.8 Ohms), you replace with the Fuel pump
- If the voltage is less than the specified limit (less than 12 V) and if continuity is not available you may please replace the Wiring harness.

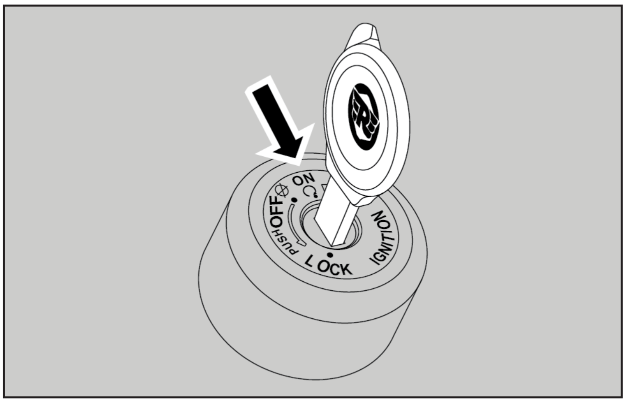
It is recommended to replace the Fuel pump /ECU / Wiring Harness as per the advice from Royal Enfield only

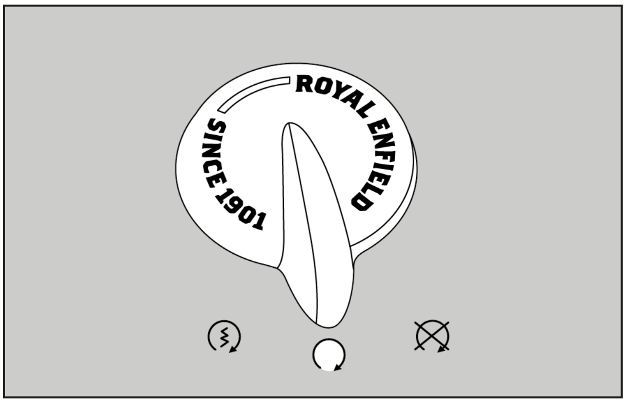
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P2300 - IGNITION COIL

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0412	Secondary air valve	Ignition coil Circuit Low / Open

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Ignition coil is also called as Spark coil

TROUBLE CODE : DTC CODE: P2300

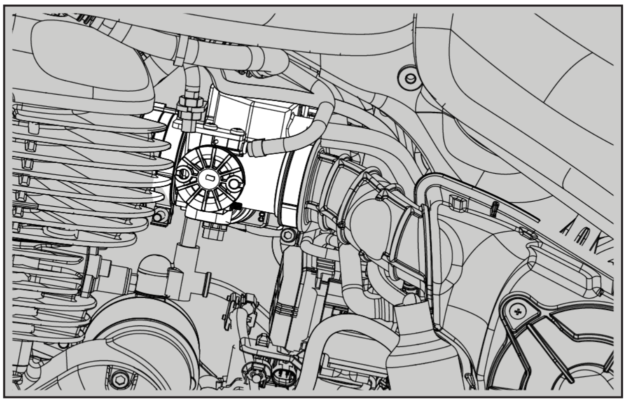
Type of error : Ignition coil Circuit Low / Open

(i) Information : Ignition coil circuit fault / Ignition coil internal fault

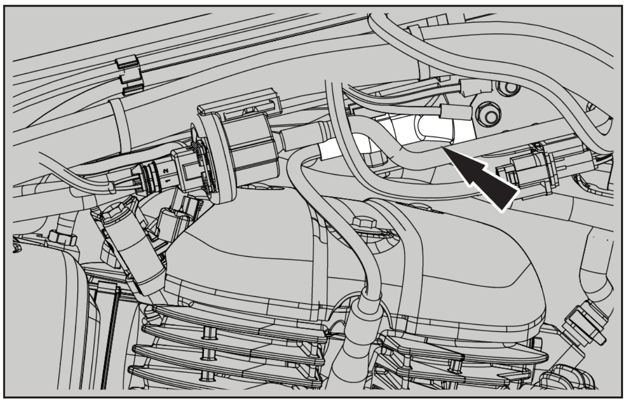
b.Preliminary Checks (Basic Check Points):

⚠ **CAUTION**
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

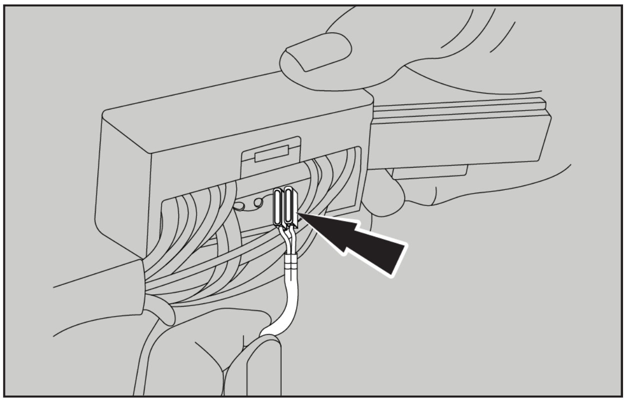
- ECU coupler is located in the Throttle body Assembly



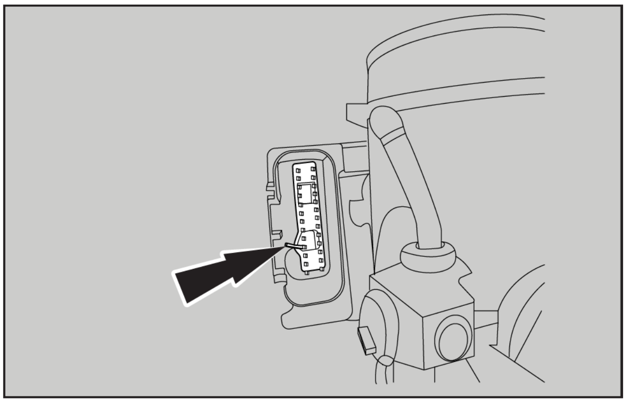
- The ignition coil is located above the cylinder head mounted on the frame.



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

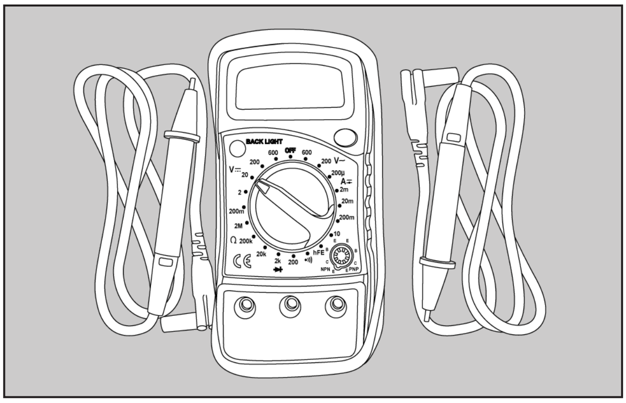
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2- Using Breakout Box method

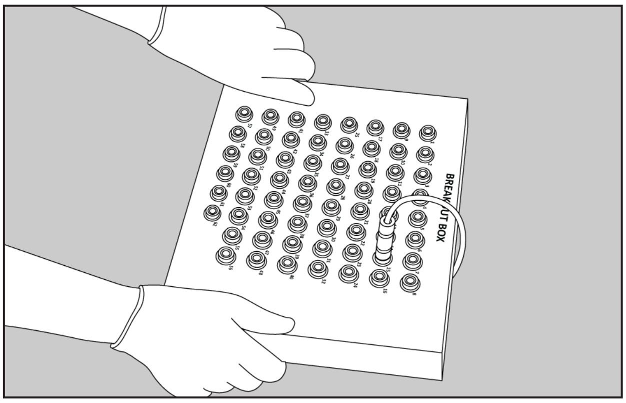
1.3 - Using Test lead wire method

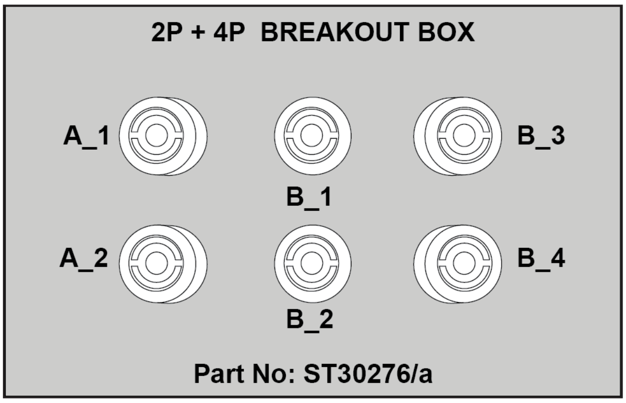
1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)

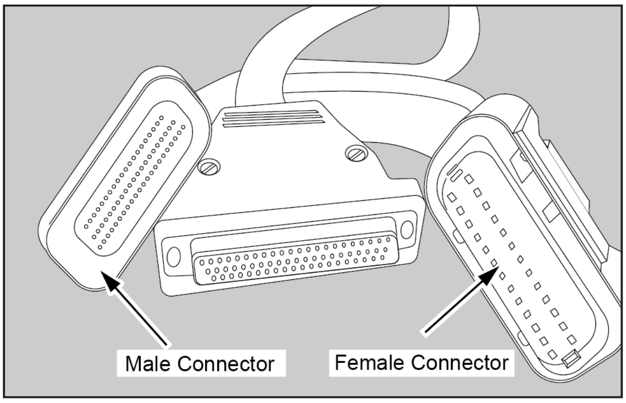


- Breakout Box (26 PIN ECU ST 30923/A & 62 P ECU Breakout Box ST 30275/A)

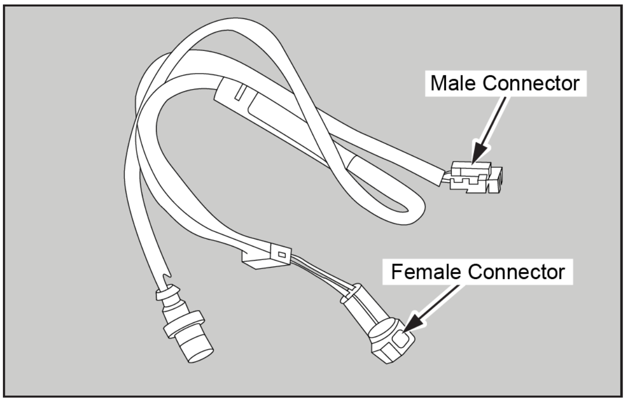

BREAKOUT BOX


2P + 4P BREAKOUT BOX
A_1
B_1
B_3
A_2
B_2
B_4
Part No: ST30276/a

- 26 pin ECU breakout box harness - ST 30923/A

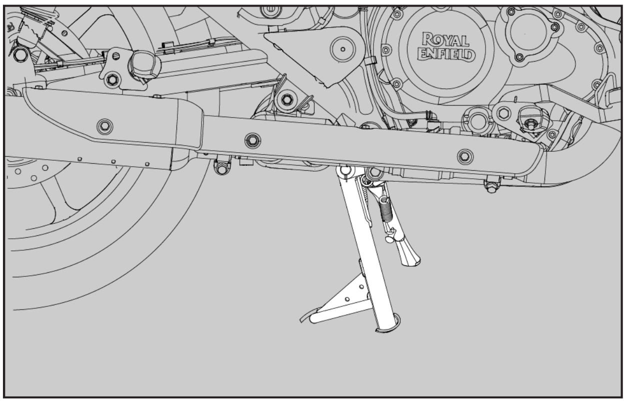

Male Connector
Female Connector

- Breakout box Ignition coil wiring harness - ST30280/A

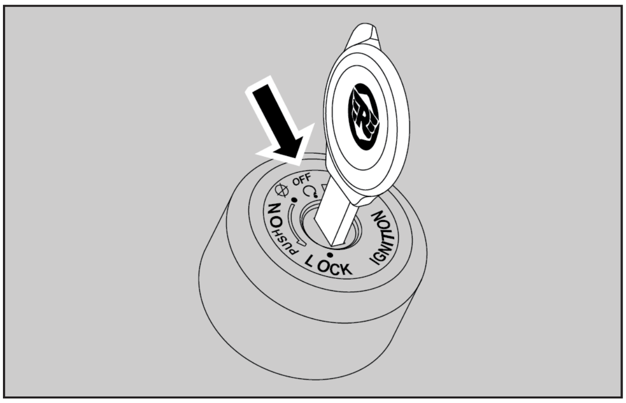

Male Connector
Female Connector

b. Pre-Checks:

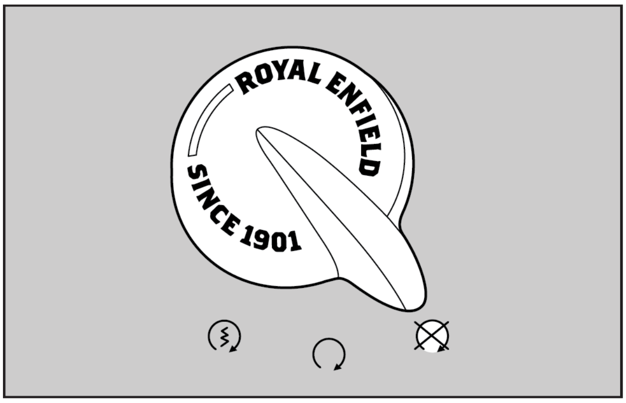
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH-ON
LOCK
IGNITION

- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery for 24 hours and use the same and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition. Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor.**
- **Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

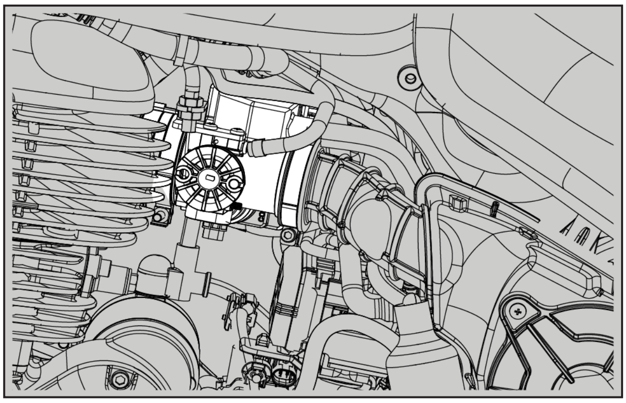
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Ignition Coil*

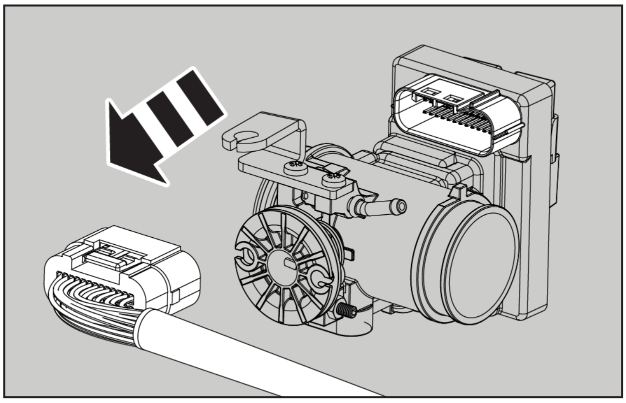
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

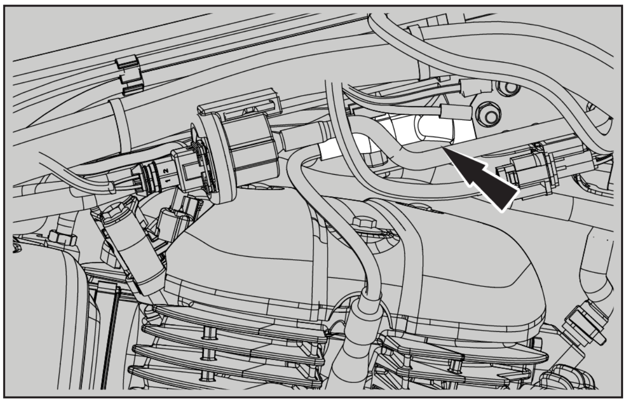
- ECU is located in the throttle body assembly



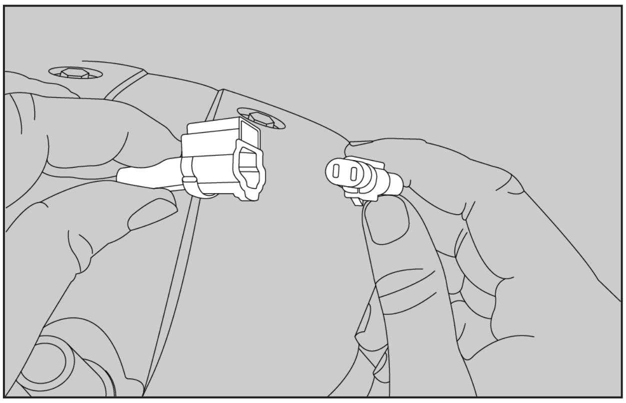
- Disconnect ECU from ECU wiring harness coupler

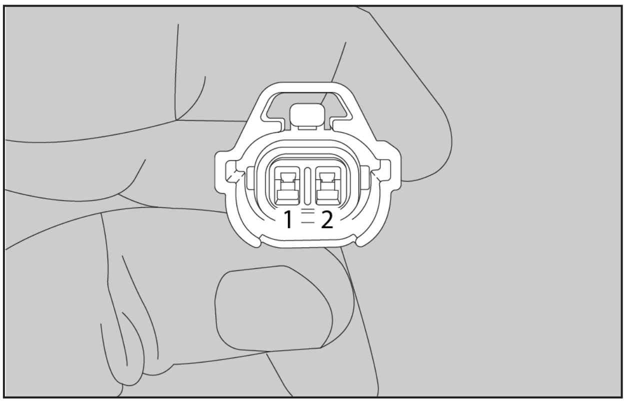


- The ignition coil is located above the cylinder head mounted on the frame.

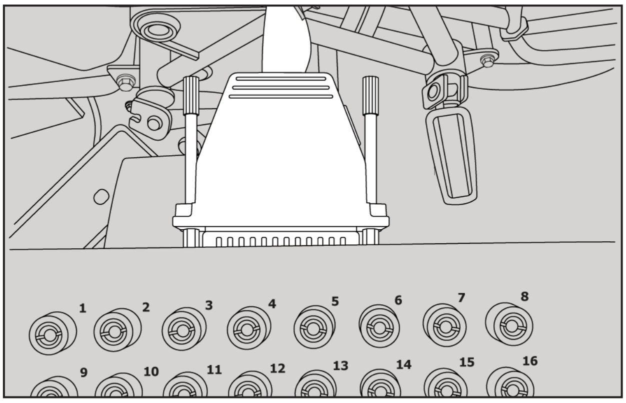


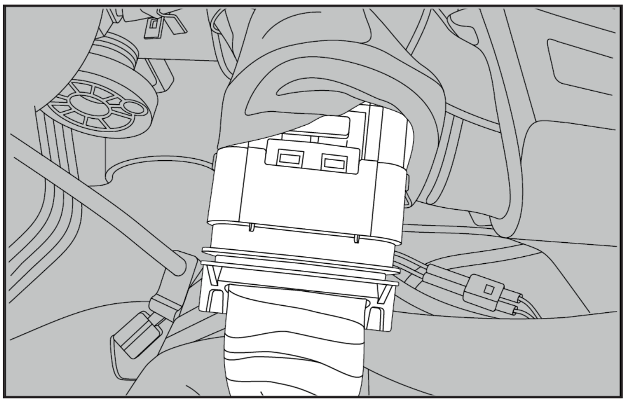
- Disconnect Ignition coil.



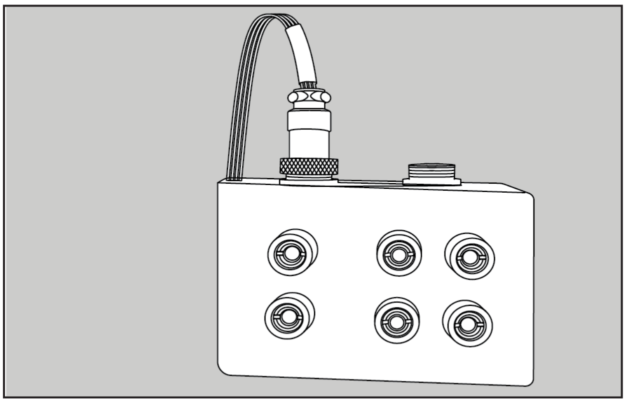


- Connect ECU and Breakout box Harness (62 Pin).



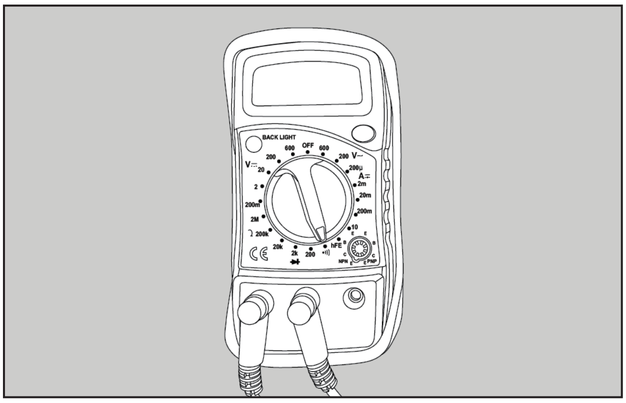


- Connect Ignition coil connector cable to Breakout Box (6 Pin)

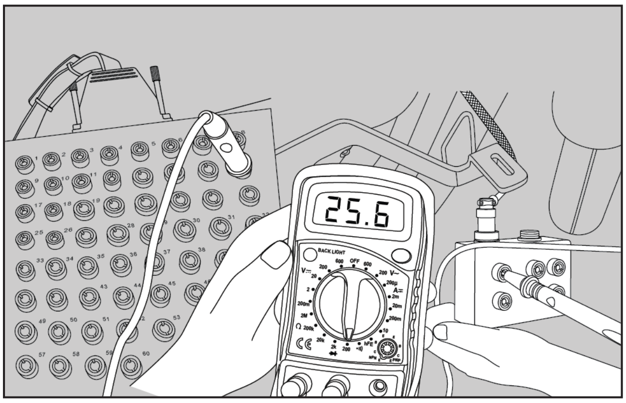


To Check Continuity of Wiring harness

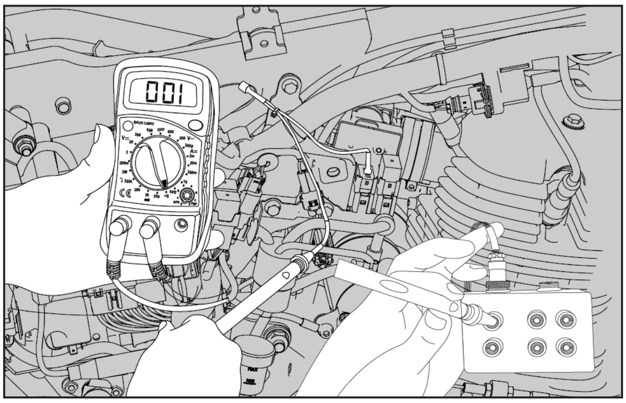
- Keep the multimeter in continuity mode.

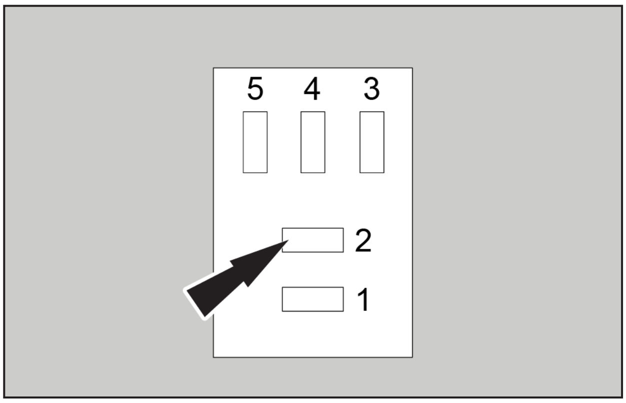


- To check continuity, keep the multimeter probe in socket 1 of the wiring coupler and socket 16 of ECU coupler. Check for continuity (Beep sound from a multimeter).



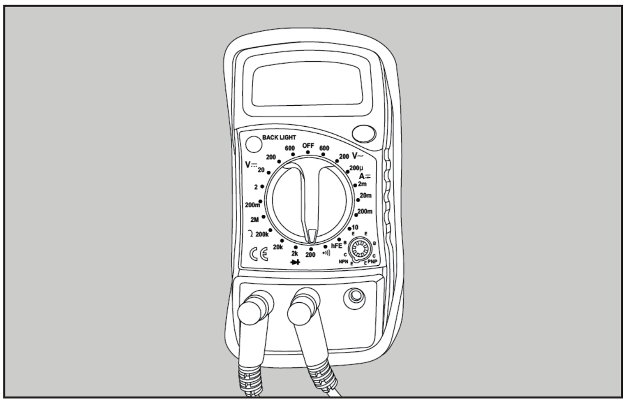
- Similarly, keep the positive probe of the multimeter in socket 2 of the Ignition coil breakout box and negative probe in Pin no 2 of the Power relay (Contact output). Check the continuity (beep sound from multimeter)



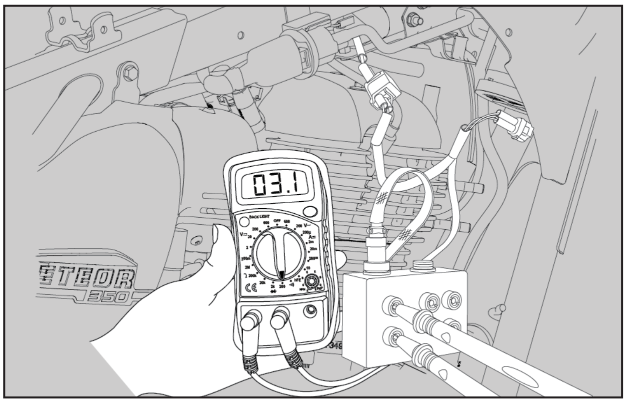


To Check Resistance of Ignition coil

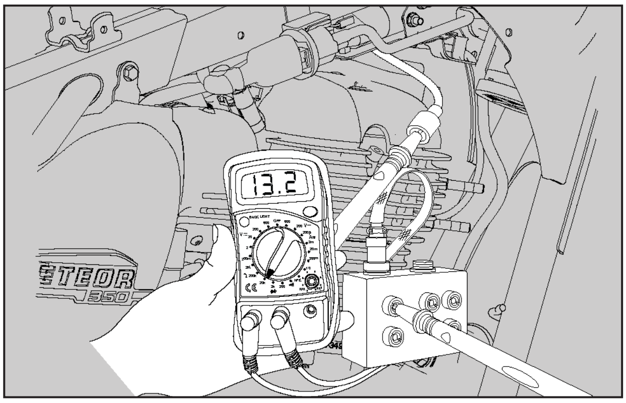
- Keep the multimeter in resistance mode (200 ohms)



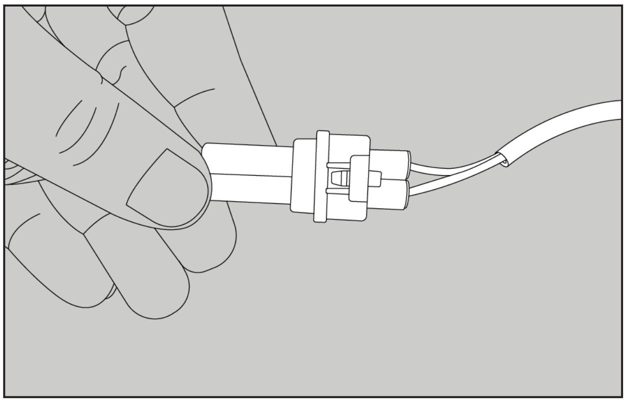
- To check the primary resistance, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 in 2P+4P ECU Breakout box . The resistance value is to be 1.8 to 2.2 Ohms @ 30+5°C



- To check the secondary resistance, remove the suppressor cap and connect the multimeter positive probe either in Socket 1 or Socket 2 of the ignition coil coupler and negative probe in Ignition coil HT lead.
- The resistance value has to be 12.15 – 14.85 K Ohms (@ 30 5 °C

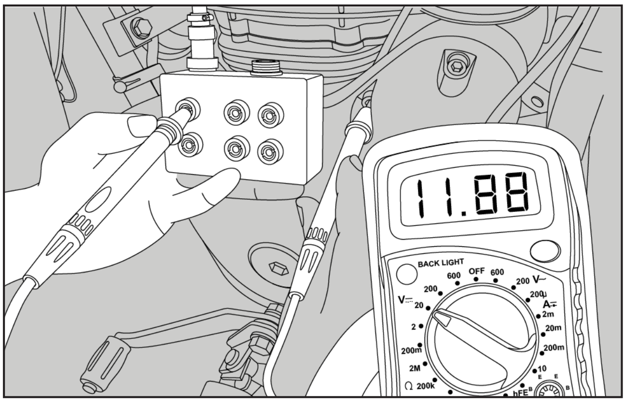


- Disconnect the cable from Ignition coil end and connect it to the wiring harness end using the other coupler present in the harness.



To Check Voltage

- To check voltage at the wiring harness end, place the positive of the multimeter in Socket 1 of the ignition coil and place the negative of the multimeter to body ground. Turn "ON" the ignition and check the voltage and it should be 12 V in the multimeter.



d. DECISION POINT:

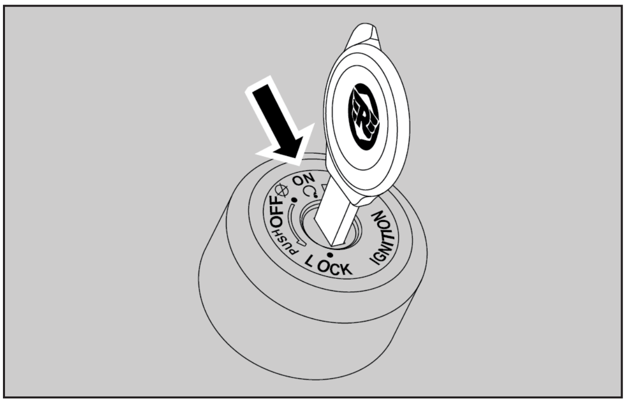
- If the resistance is not within the specified limit (1.8 to 2.2 Ohms)primary and (12.15 to 14.85 K Ohms) secondary, you replace with the Ignition coil
- If the resistance is within the specified limit and if continuity and voltage is available and no spark is observed, then you may replace the ECU.
- If continuity is not available you may please replace the Wiring harness.
- It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

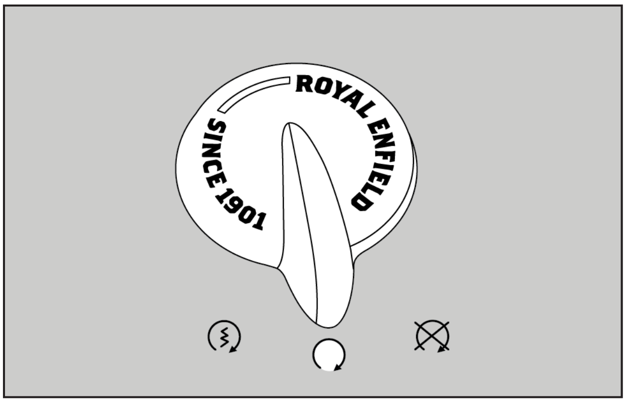
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

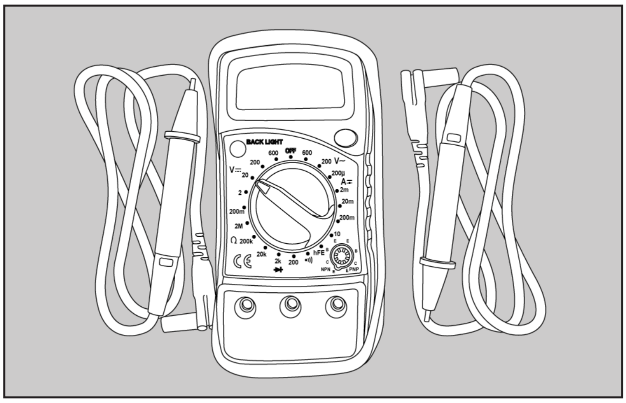
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting etc.**

Tools Required

- Multimeter (Universal)

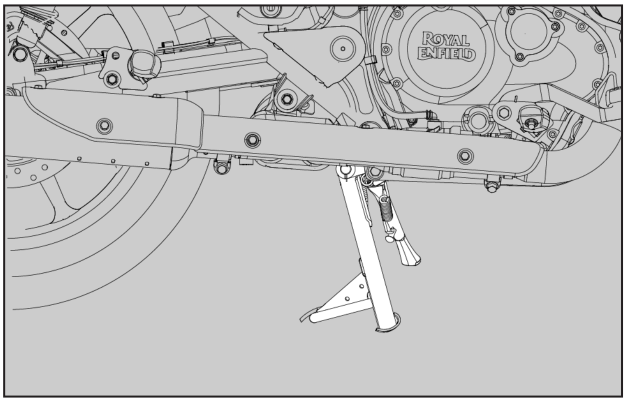


- Test Lead Wire (90 SERIES - ORANGE Color)
- Test Lead Wire (40 SERIES - YELLOW Color)
- Refer Chart for Color identification of Pins (It will be given as hyperlink)

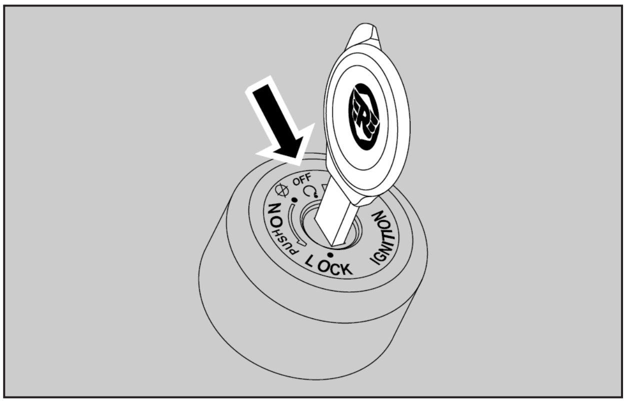
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

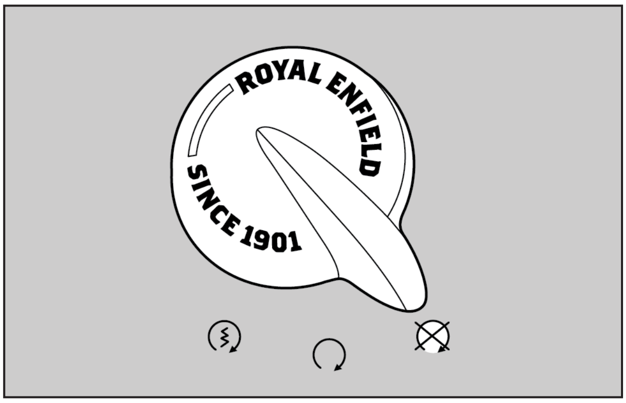
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

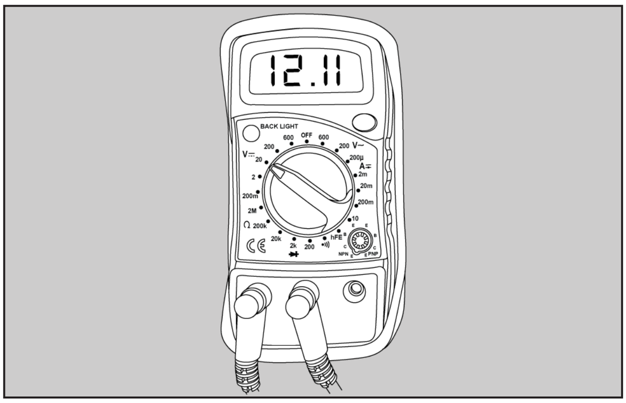


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

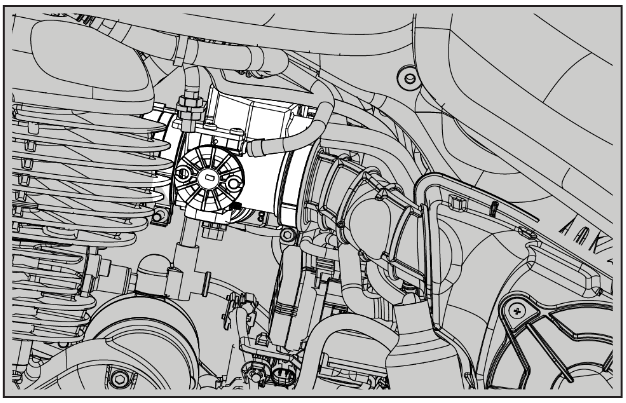
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Ignition Coil*

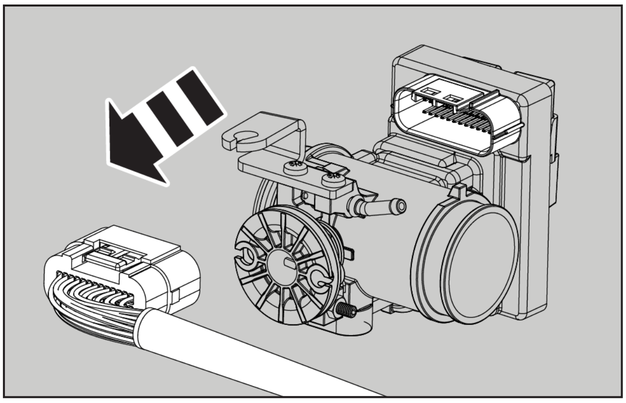
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

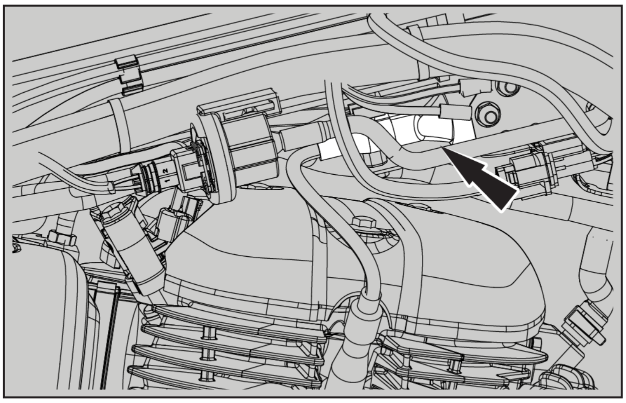
- ECU is located on the throttle body assembly



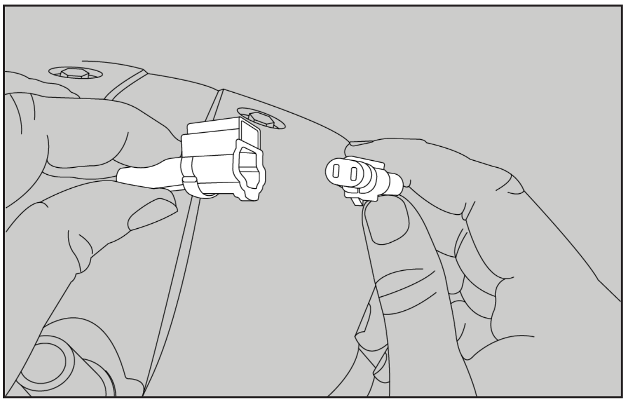
- Disconnect ECU from ECU wiring harness coupler

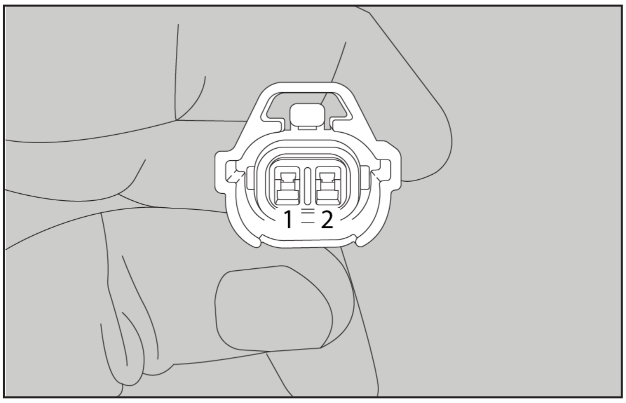


- The ignition coil is located above the cylinder head mounted on the frame.



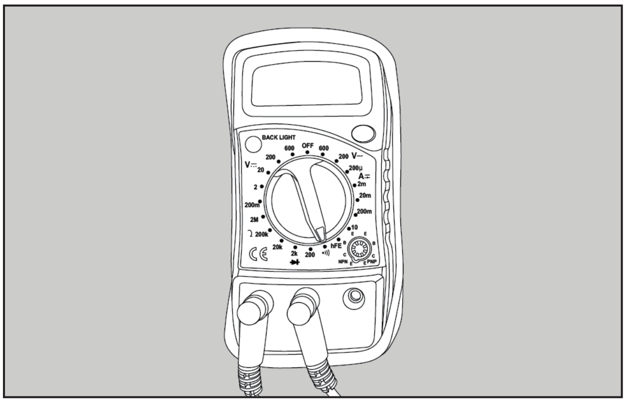
- Disconnect Ignition coil.



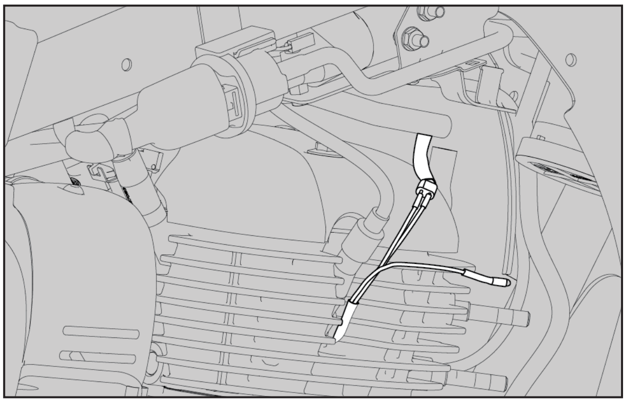


To check the Continuity of the wiring harness

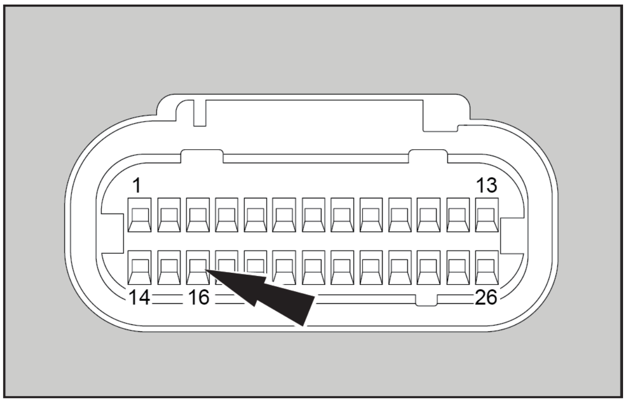
- Keep the multimeter in continuity mode



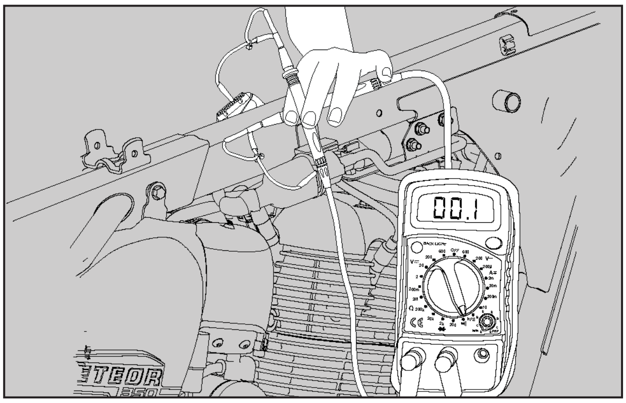
- Connect test lead wire 90 series (orange color) with black tag to Pin 1 of the sensor wiring harness socket.



- Connect test lead wire 40 series (yellow color) with the black tag to Pin 16 of the ECU harness socket.

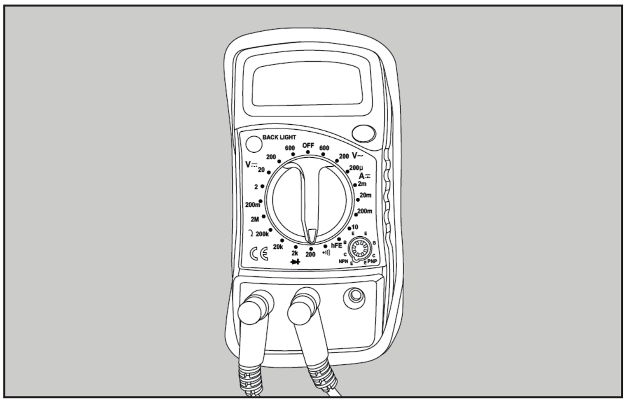


- Check for continuity (Beep sound from multimeter)

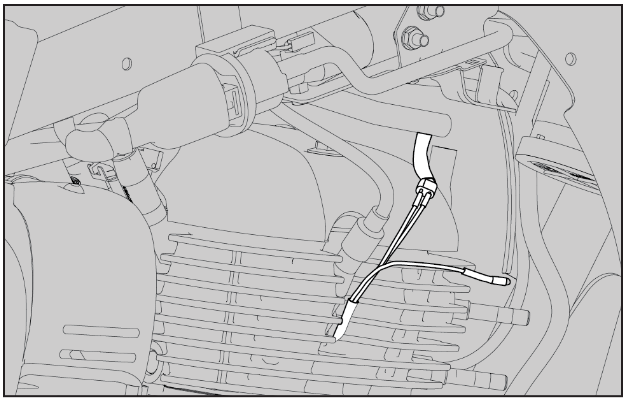


To check the Resistance

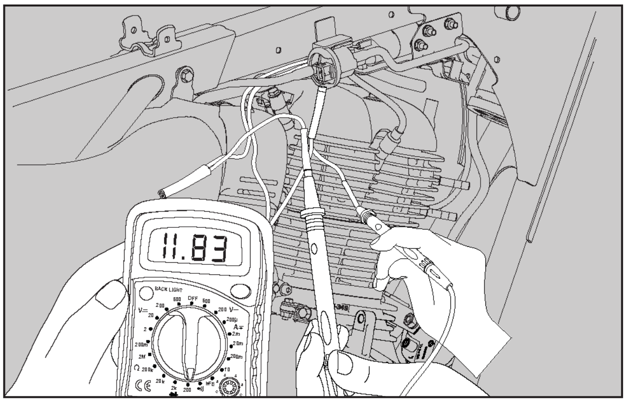
- Keep the multimeter in resistance mode (200 ohms)



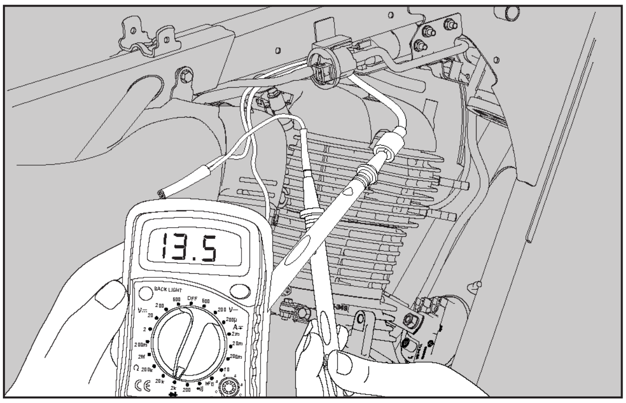
- To check the primary resistance, connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor socket and test lead wire 90 series (orange color) with the red tag to pin 2 of the sensor socket



- Check a voltage it should be 1.8 to 2.2 Ohms @ 30+5°C

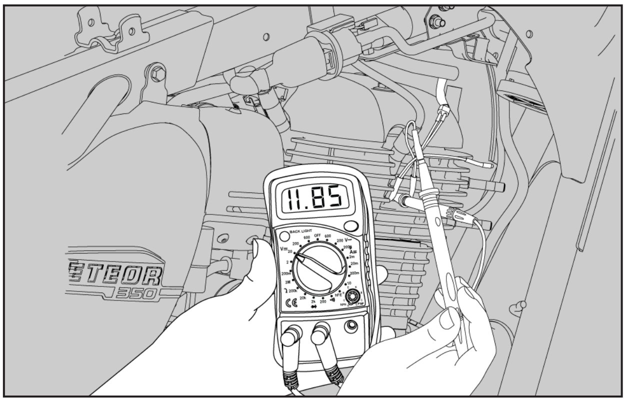


- To check the secondary resistance, remove the suppressor cap and check either Pin 1 or Pin 2 to Ignition coil HT lead. Resistance value to be 12.15 to 14.85K Ohms @ 30+5°C



To check the Voltage

- Connect the multimeter positive probe to pin 1 and negative to body ground in the wiring harness coupler and turn “ON” the ignition. The voltage should be equal to the battery voltage. The voltage should be equal as the battery voltage (12V)



d. Decision Point:

- If the resistance is not within the specified limit (1.8 to 2.2 Ohms)primary and (12.15 to 14.85 K Ohms) secondary, you can replace the Ignition coil.
- If the voltage is meeting the specified limit and if continuity is available you have to replace the ECU.
- If continuity is not available you may please replace the Wiring harness.

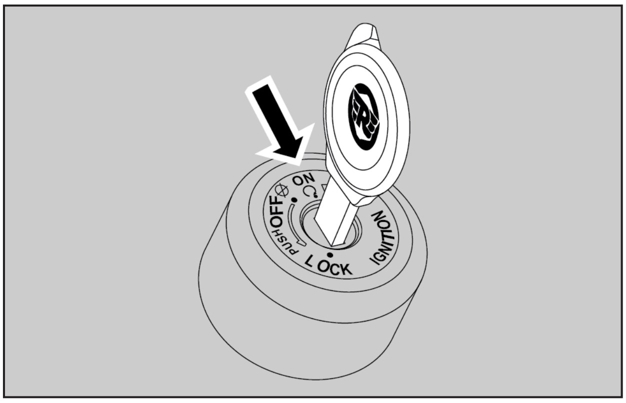
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

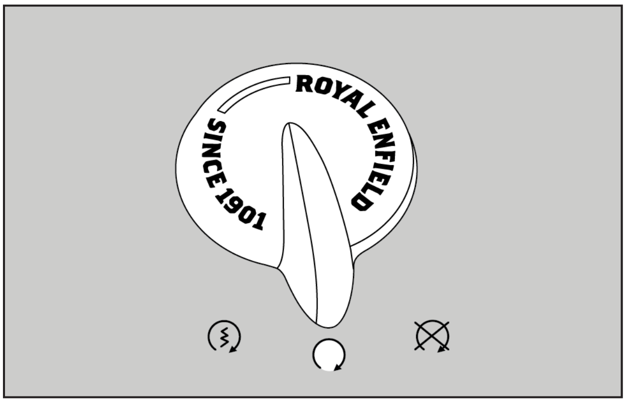
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched “ON”, DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in “ON” Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Switch “OFF” the ignition key and again switch “ON” - repeat this cycle for 3 times till the MIL is “OFF”
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P2301 - IGNITION COIL

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P2301	Ignition coil	Ignition coil Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

Ignition coil is also called as Spark coil

TROUBLE CODE : DTC CODE: P2301

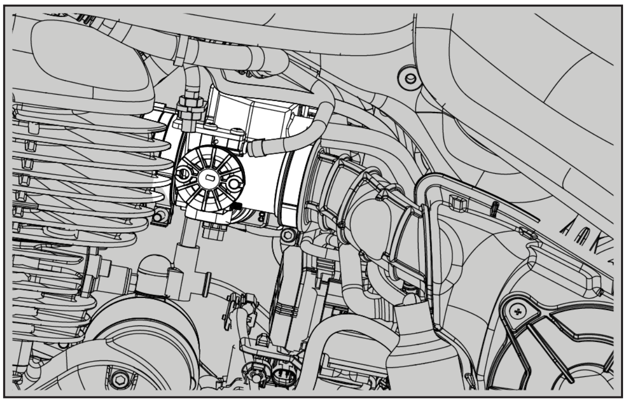
Type of error : Ignition coil Circuit High

(i) Information : Ignition coil circuit fault / Ignition coil internal fault

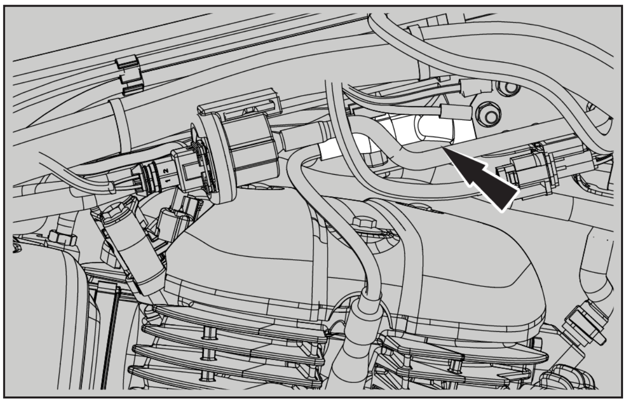
b.Preliminary Checks (Basic Check Points):

⚠ **CAUTION**
Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

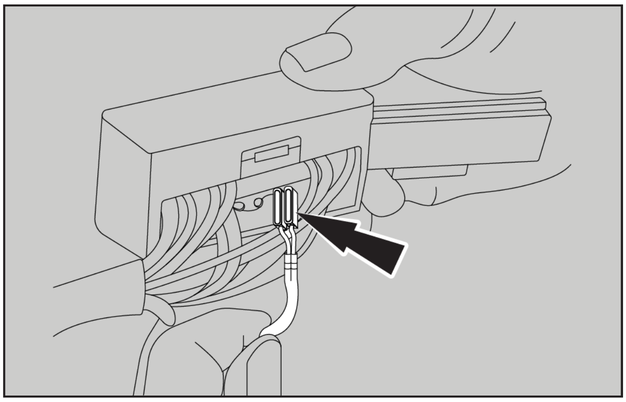
- ECU coupler is located in the Throttle body Assembly



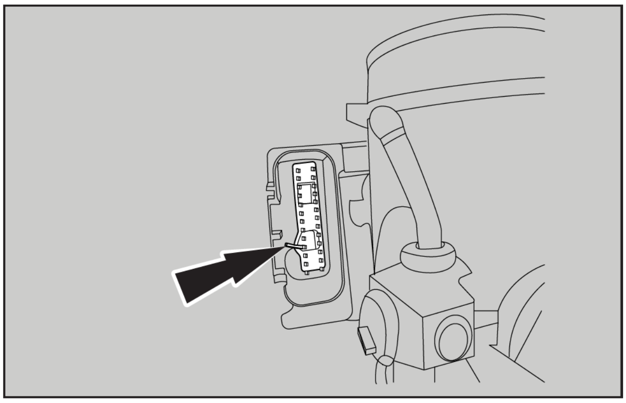
- The ignition coil is located above the cylinder head mounted on the frame.



- Ensure there is no loose connection of the coupler or pin backout from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab.

" REFRESH DTC OPTION HAS TO APPEAR HERE"

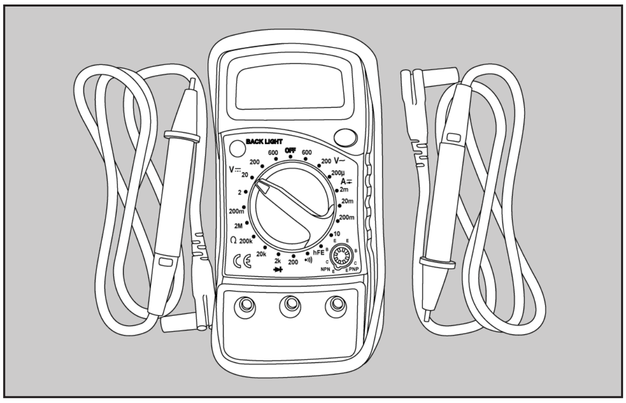
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2- Using Breakout Box method

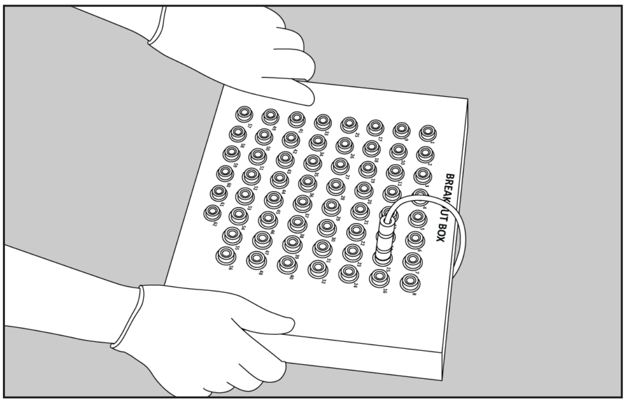
1.3 - Using Test lead wire method

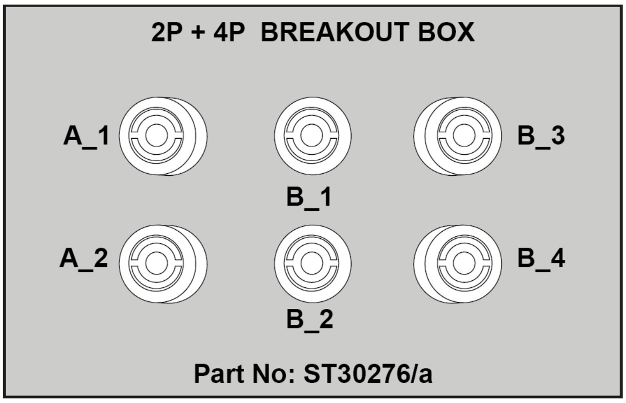
1.2. USING BREAKOUT BOX METHOD

- **Tools Required**
- Multimeter (Universal)

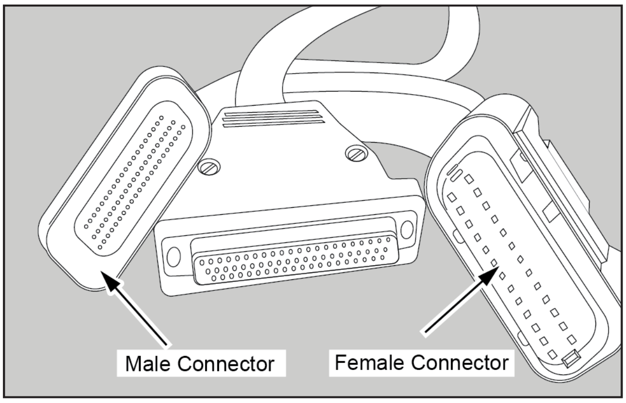


- Breakout Box (26 PIN ECU ST 30923/A & 62 P ECU Breakout Box ST 30275/A)

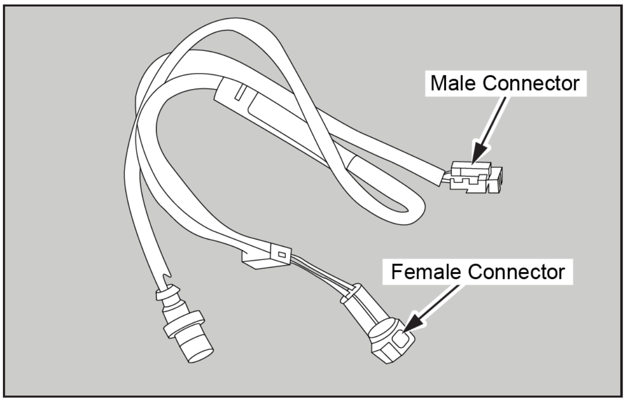



2P + 4P BREAKOUT BOX
A_1
B_3
B_1
A_2
B_4
B_2
Part No: ST30276/a

- 26 pin ECU breakout box harness - ST 30923/A

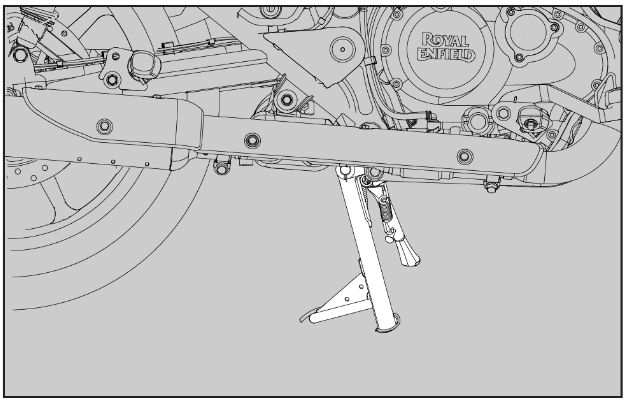

Male Connector
Female Connector

- Breakout box Ignition coil wiring harness - ST30280/A

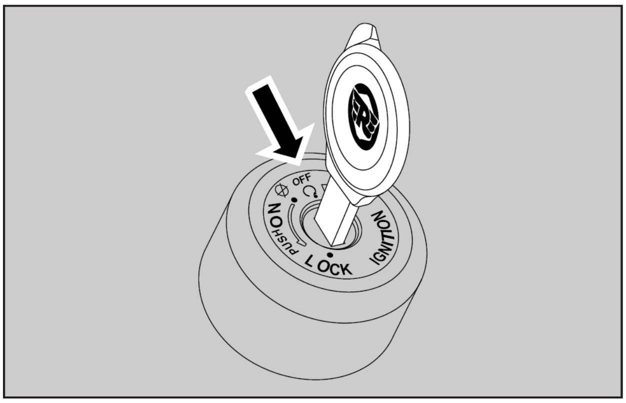

Male Connector
Female Connector

b. Pre-Checks:

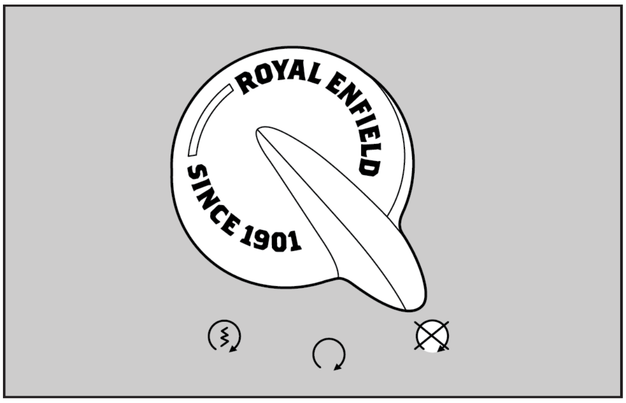
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH-ON
LOCK
IGNITION

- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery for 24 hours and use the same and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system.

After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics

⚠ CAUTION

- **Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers**
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition. Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor.**
- **Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**

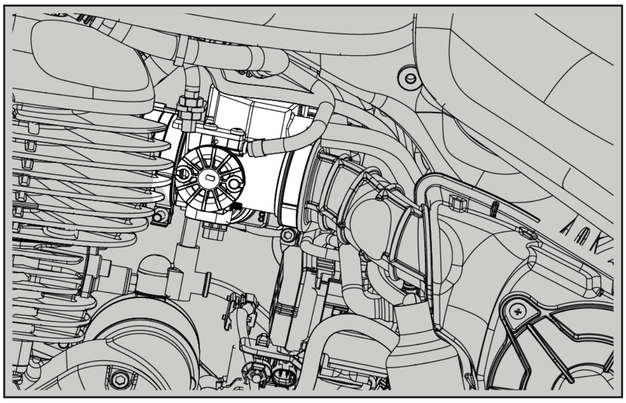
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Ignition Coil*

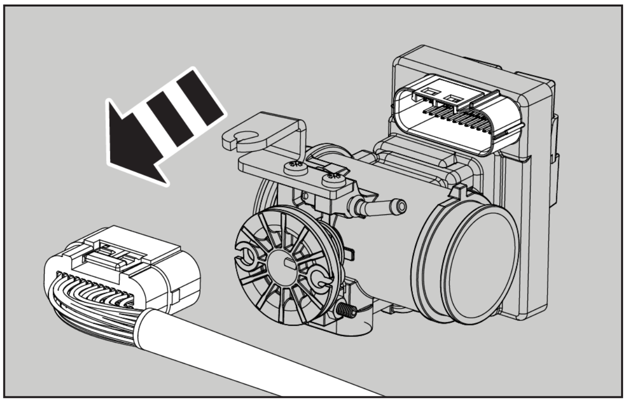
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

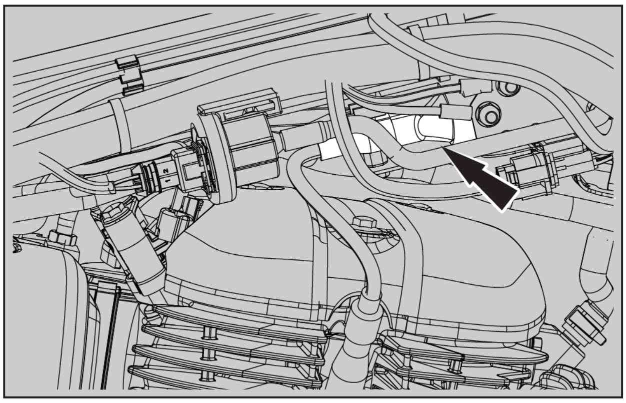
- ECU is located in the throttle body assembly



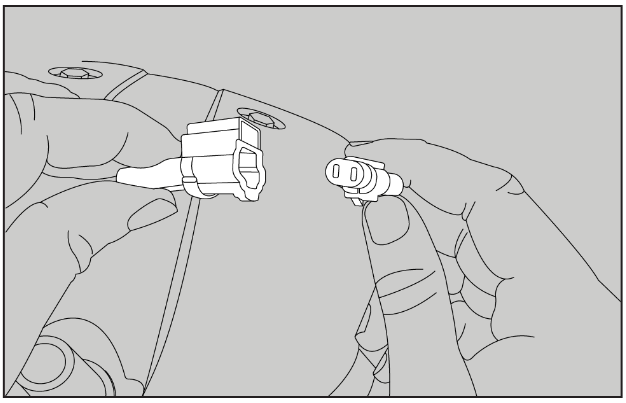
- Disconnect ECU from ECU wiring harness coupler

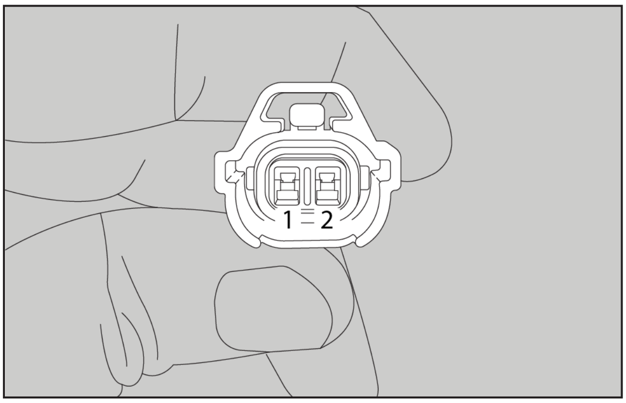


- The ignition coil is located above the cylinder head mounted on the frame.

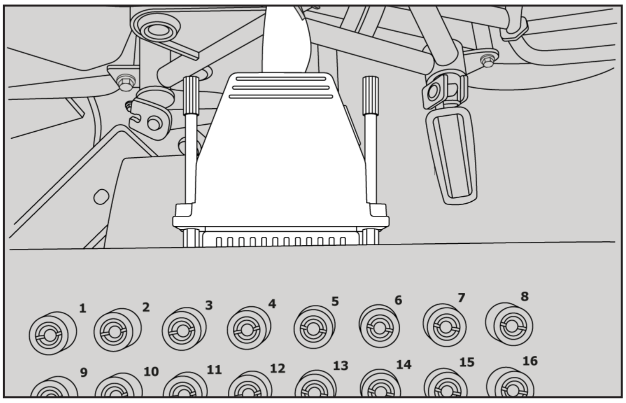


- Disconnect Ignition coil.





- Connect ECU and Breakout box Harness (62 Pin).


1
2
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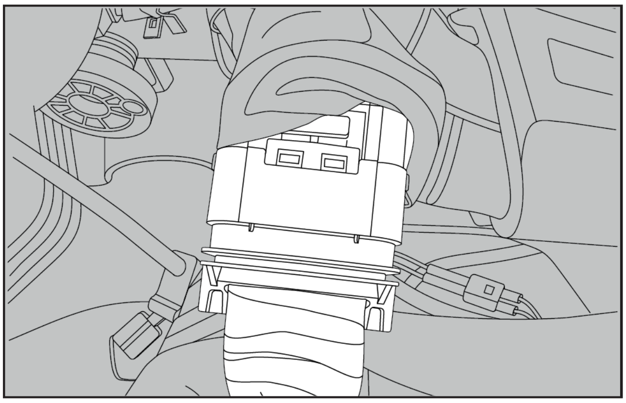
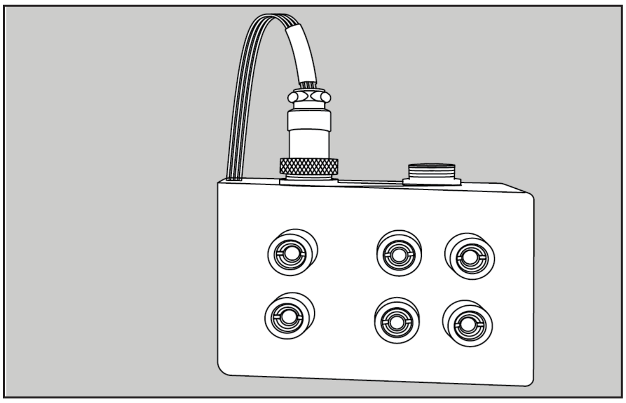
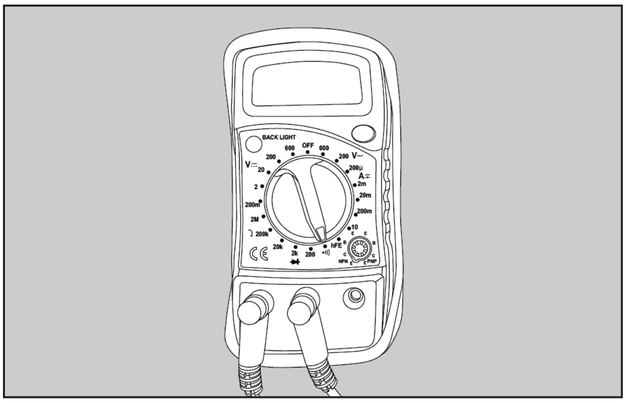


- Connect Ignition coil connector cable to Breakout Box (6 Pin)

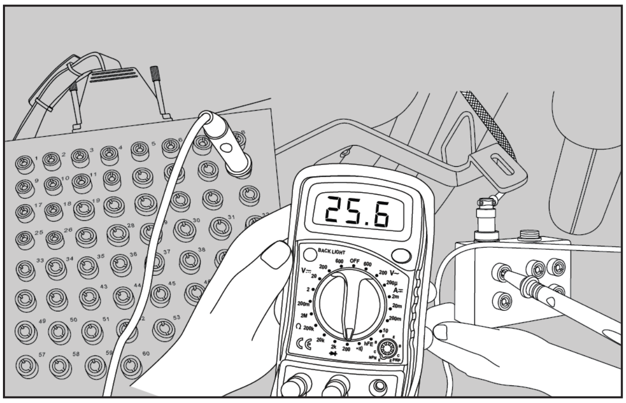


To Check Continuity of Wiring harness

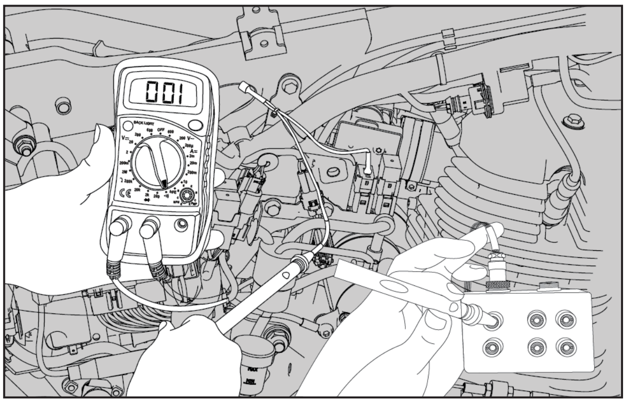
- Keep the multimeter in continuity mode.

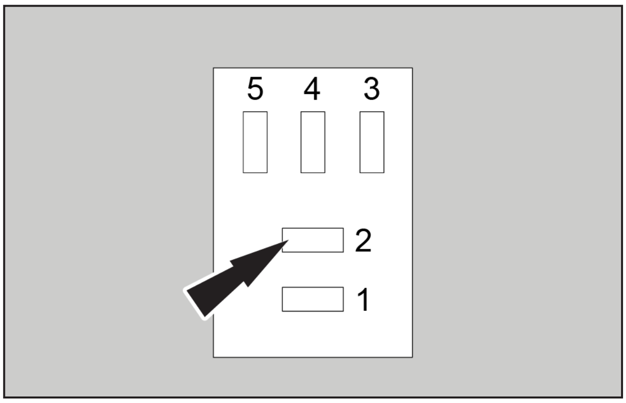

BACK LIGHT
OFF
600
200
V
A

- To check continuity, keep the multimeter probe in socket 1 of the wiring coupler and socket 16 of ECU coupler. Check for continuity (Beep sound from a multimeter).



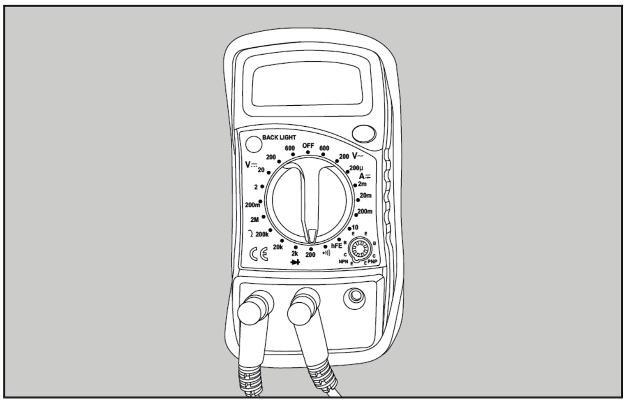
- Similarly, keep the positive probe of the multimeter in socket 2 of the Ignition coil breakout box and negative probe in Pin no 2 of the Power relay (Contact output). Check the continuity (beep sound from multimeter)



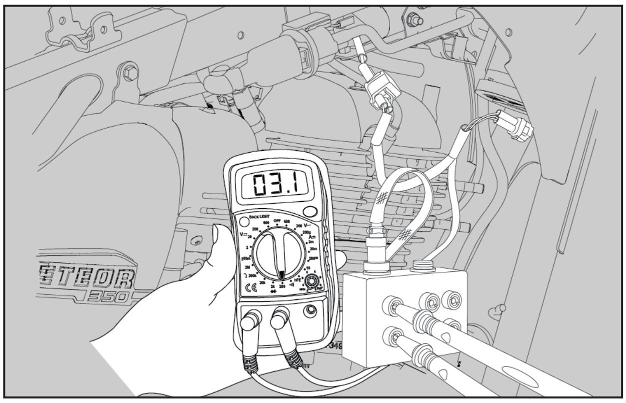


To Check Resistance of Ignition coil

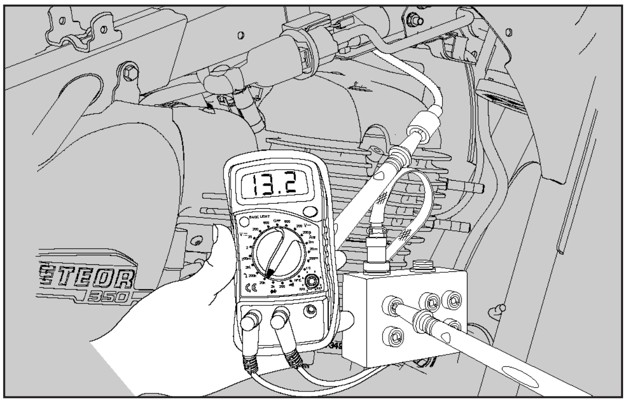
- Keep the multimeter in resistance mode (200 ohms)



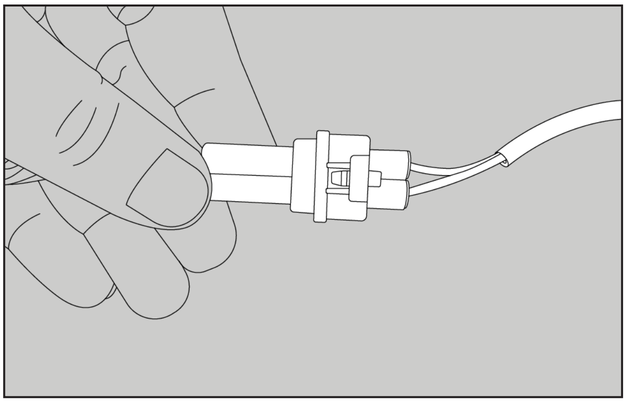
- To check the primary resistance, connect the multimeter positive probe in Socket 1 and negative probe in Socket 2 in 2P+4P ECU Breakout box . The resistance value is to be 1.8 to 2.2 Ohms @ 30+5°C



- To check the secondary resistance, remove the suppressor cap and connect the multimeter positive probe either in Socket 1 or Socket 2 of the ignition coil coupler and negative probe in Ignition coil HT lead.
- The resistance value has to be 12.15 – 14.85 K Ohms (@ 30 5 °C

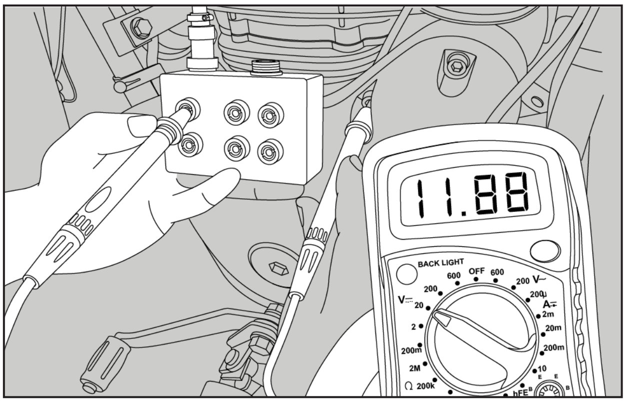


- Disconnect the cable from Ignition coil end and connect it to the wiring harness end using the other coupler present in the harness.



To Check Voltage

- To check voltage at the wiring harness end, place the positive of the multimeter in Socket 1 of the ignition coil and place the negative of the multimeter to body ground. Turn "ON" the ignition and check the voltage and it should be 12 V in the multimeter.



d. DECISION POINT:

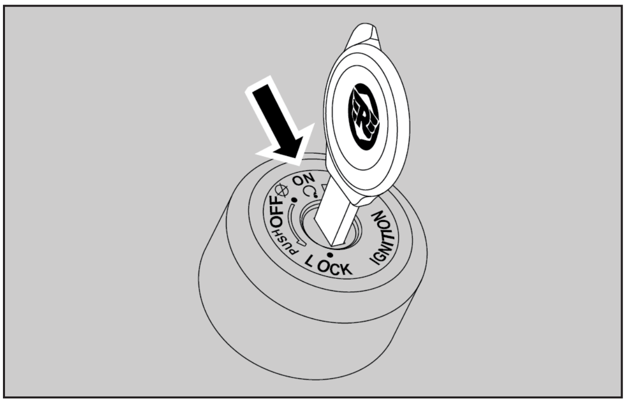
- If the resistance is not within the specified limit (1.8 to 2.2 Ohms)primary and (12.15 to 14.85 K Ohms) secondary, you replace with the Ignition coil
- If the resistance is within the specified limit and if continuity and voltage is available and no spark is observed, then you may replace the ECU.
- If continuity is not available you may please replace the Wiring harness.
- It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

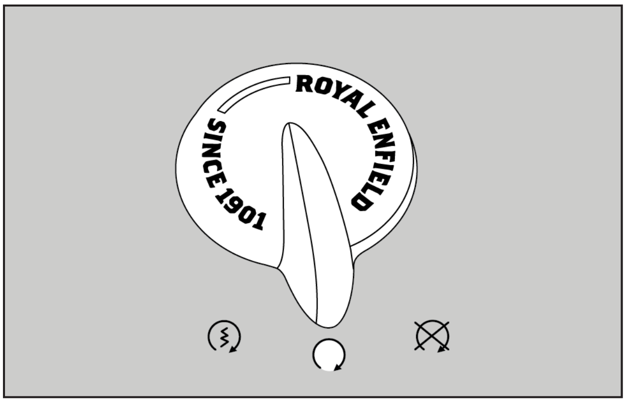
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

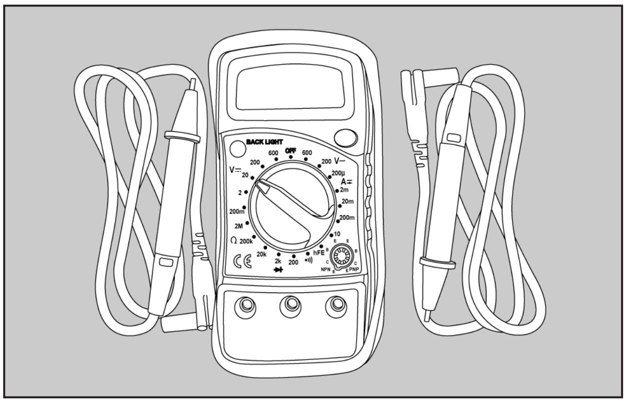
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire is inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To be used only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation of fluctuation in voltage**
- **Do not disconnect and connect any sensor or ECU with ignition "ON"**
- **With sensor connector disconnected and ignition is switched "ON", DTC will occur and neet to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service centre, jump starting etc.**

Tools Required

- Multimeter (Universal)

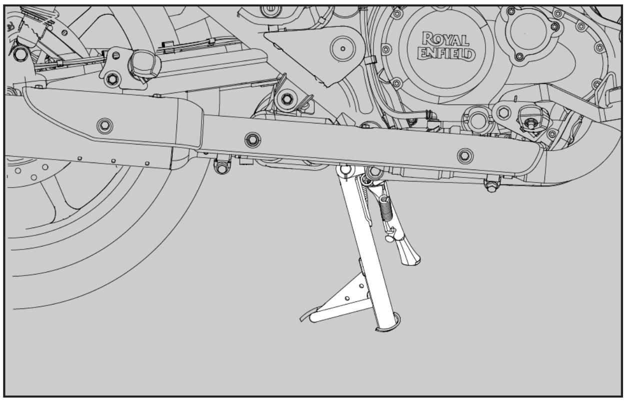


- Test Lead Wire (90 SERIES - ORANGE Color)
- Test Lead Wire (40 SERIES - YELLOW Color)
- Refer Chart for Color identification of Pins (It will be given as hyperlink)

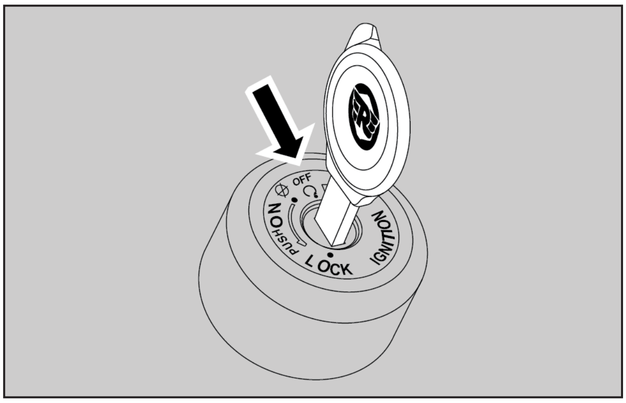
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

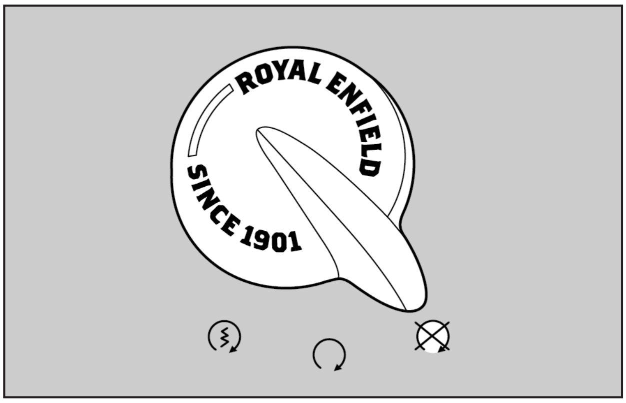
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in "OFF" condition

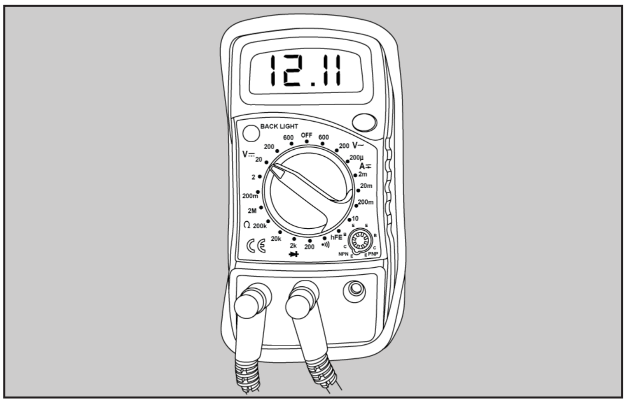


- Ensure the Kill Switch is in "OFF" condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the steps mentioned below

c. Diagnostics:

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/couplers

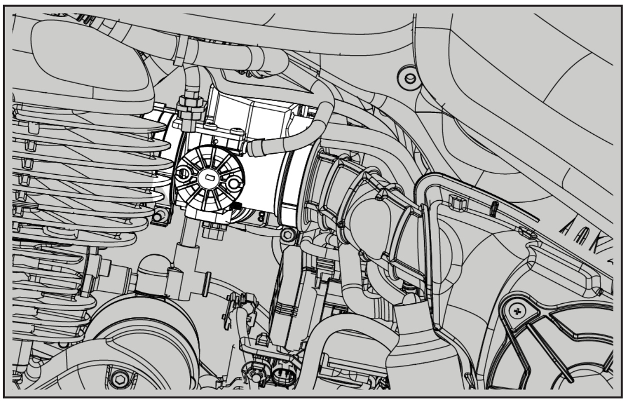
NOTE

- *Please remove seat assembly and fuel tank from the motorcycle to access the Ignition Coil*

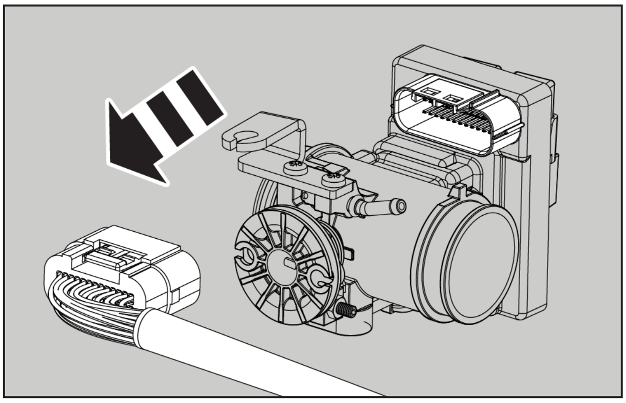
NOTE

- *Removal & refitment of seat, fuel tank is mentioned in the service manual (exclusive hyperlink here)*

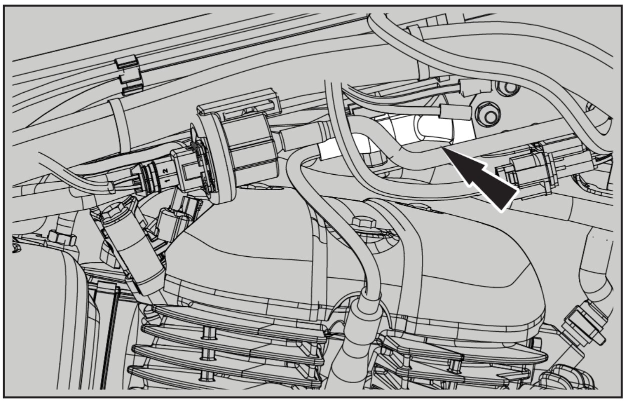
- ECU is located on the throttle body assembly



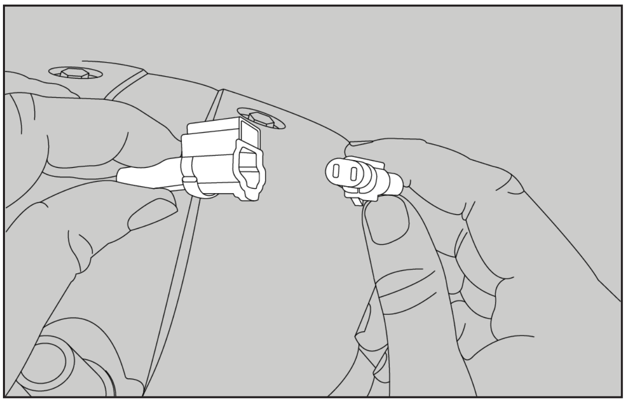
- Disconnect ECU from ECU wiring harness coupler

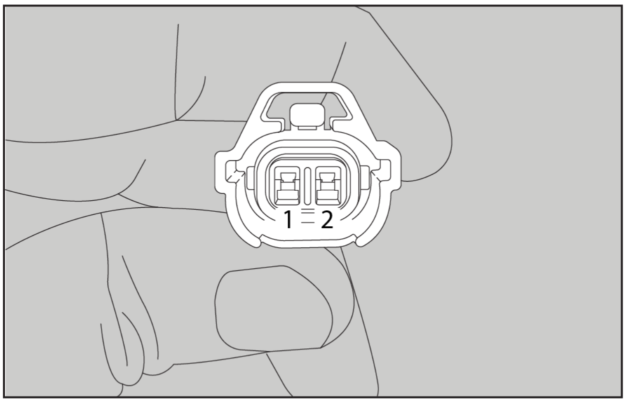


- The ignition coil is located above the cylinder head mounted on the frame.



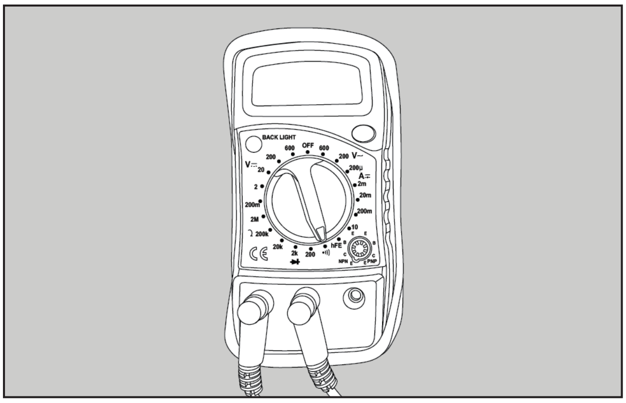
- Disconnect Ignition coil.



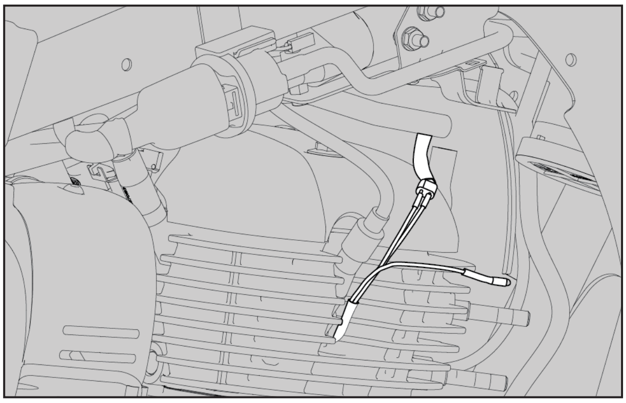


To check the Continuity of the wiring harness

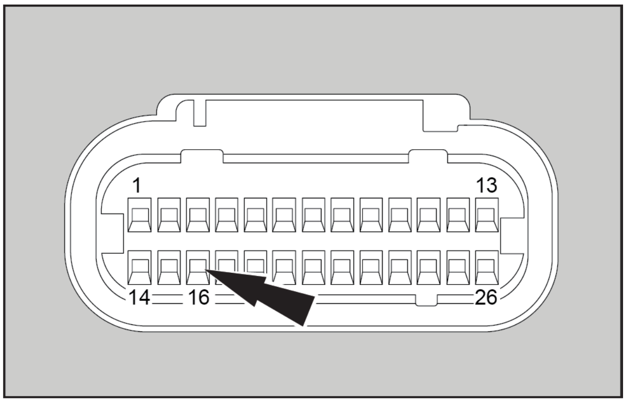
- Keep the multimeter in continuity mode



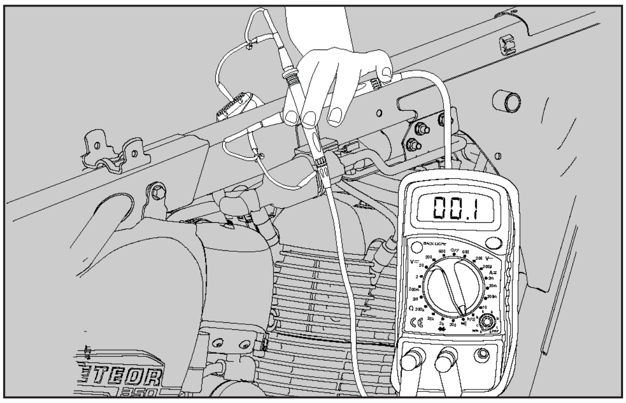
- Connect test lead wire 90 series (orange color) with black tag to Pin 1 of the sensor wiring harness socket.



- Connect test lead wire 40 series (yellow color) with the black tag to Pin 16 of the ECU harness socket.

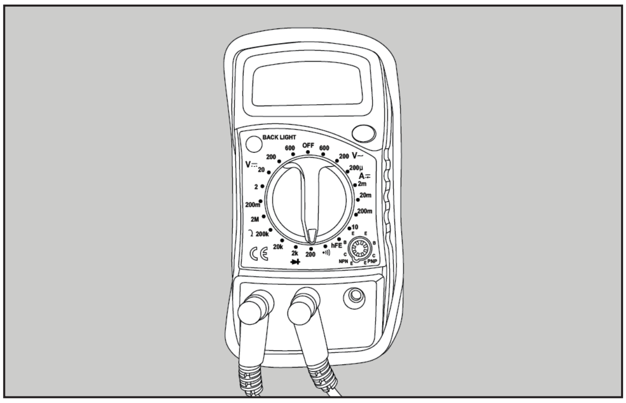


- Check for continuity (Beep sound from multimeter)

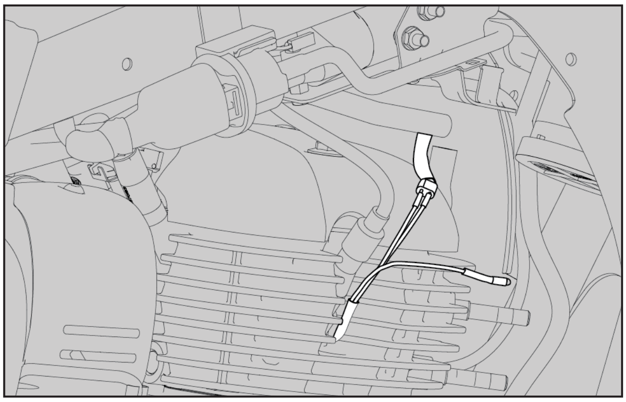


To check the Resistance

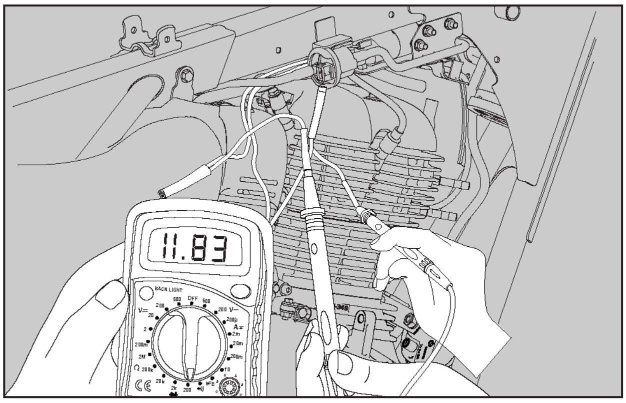
- Keep the multimeter in resistance mode (200 ohms)



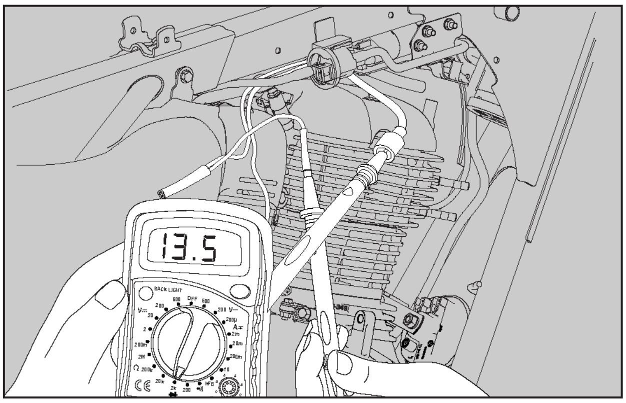
- To check the primary resistance, connect test lead wire 90 series (orange color) with the black tag to Pin 1 of the sensor socket and test lead wire 90 series (orange color) with the red tag to pin 2 of the sensor socket



- Check a voltage it should be 1.8 to 2.2 Ohms @ 30+5°C

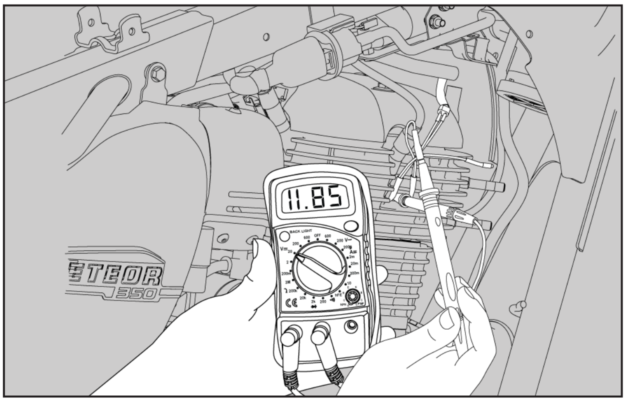


- To check the secondary resistance, remove the suppressor cap and check either Pin 1 or Pin 2 to Ignition coil HT lead. Resistance value to be 12.15 to 14.85K Ohms @ 30+5°C



To check the Voltage

- Connect the multimeter positive probe to pin 1 and negative to body ground in the wiring harness coupler and turn "ON" the ignition. The voltage should be equal to the battery voltage. The voltage should be equal as the battery voltage (12V)



d. Decision Point:

- If the resistance is not within the specified limit (1.8 to 2.2 Ohms)primary and (12.15 to 14.85 K Ohms) secondary, you can replace the Ignition coil.
- If the voltage is meeting the specified limit and if continuity is available you have to replace the ECU.
- If continuity is not available you may please replace the Wiring harness.

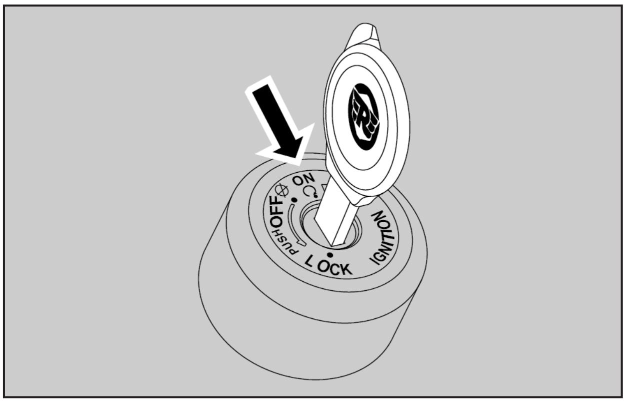
It is recommended to replace the sensor /ECU / Wiring Harness as per the advice from Royal Enfield only

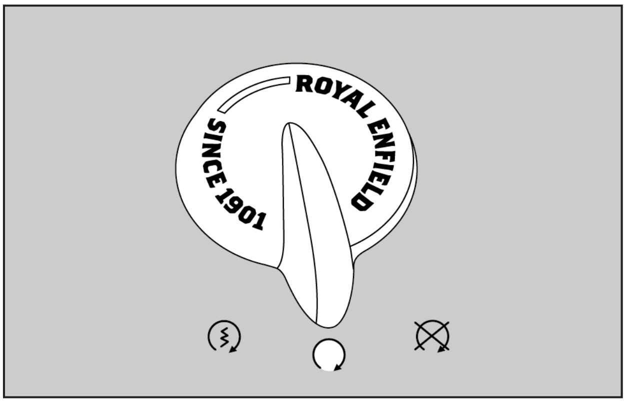
4. DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

P0112 - INTAKE AIR TEMPERATURE SENSOR DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0112	Intake Air Temperature Sensor	Intake Air Temperature Sensor Circuit Low

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0112

Type of error : Intake Air Temperature Sensor Circuit Low

(i) Information : Intake Air Temperature Sensor Circuit Low circuit fault / Intake Air Temperature Sensor Circuit Low internal fault

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0113 - INTAKE AIR TEMPERATURE SENSOR DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0112	Intake Air Temperature Sensor	Intake Air Temperature Sensor Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0112

Type of error : Intake Air Temperature Sensor Circuit High

(i) Information : Intake Air Temperature Sensor Circuit Low circuit fault / Intake Air Temperature Sensor Circuit Low internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0107 - MANIFOLD ABSOLUTE PRESSURE SENSOR DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0107	Manifold Absolute Pressure Sensor	Manifold Absolute Pressure Circuit Low

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0107

Type of error : Manifold Absolute Pressure Circuit Low/Open

(i) Information : Manifold Absolute Pressure Circuit Low circuit fault /Manifold Absolute Pressure Circuit Low internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0108 - MANIFOLD ABSOLUTE PRESSURE SENSOR DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0108	Manifold Absolute Pressure Sensor	Manifold Absolute Pressure Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0108

Type of error : Manifold Absolute Pressure Circuit High

(i) Information : Manifold Absolute Pressure Circuit High circuit fault /Manifold Absolute Pressure Circuit High internal fault

⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0121 - THROTTLE POSITION SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0121	Throttle Position Sensor	Throttle Position sensor Circuit/Adaption out of control

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0121

Type of error : Throttle Position sensor Circuit/Adaption out of control

(i) Information : Throttle Position sensor Circuit fault /Throttle Position sensor Circuit internal fault

⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0122 - THROTTLE POSITION SENSOR DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0122	Throttle Position Sensor	Throttle Position sensor Circuit Low/Open

NOTE

- *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0122

Type of error : Throttle Position sensor Circuit Low/Open

(i) Information : Throttle Position sensor Circuit fault /Throttle Position sensor Circuit internal fault

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0123 - THROTTLE POSITION SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0123	Throttle Position Sensor	Throttle Position sensor Circuit High

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0123

Type of error : Throttle Position sensor Circuit High

(i) Information : Throttle Position sensor Circuit fault /Throttle Position sensor Circuit internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0505 - STEPPER MOTOR/IDLE AIR CONTROLLER DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0505	Stepper Motor/Idle Air Controller	Idle Air Control System Malfunction

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0505

Type of error : Idle Air Control System Malfunction

(i) Information : Idle Air Control System fault /Idle Air Control System Malfunction internal fault

⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0508 - STEPPER MOTOR/IDLE AIR CONTROLLER DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0112	Stepper Motor/Idle Air Controller	Idle Air Control System Low/Open

NOTE
- *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0508

Type of error : Idle Air Control System Low/Open

(i) Information : Idle Air Control System fault /Idle Air Control System Malfunction internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0509 - STEPPER MOTOR/IDLE AIR CONTROLLER DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0509	Stepper Motor/Idle Air Controller	Idle Air Control System High

NOTE
- *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P0509

Type of error : Idle Air Control System High

(i) Information : Idle Air Control System fault /Idle Air Control System Malfunction internal fault (Suggested Simple Description)

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P1530 - ROLL OVER SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1530	Roll Over Sensor	Roll Over Sensor Position Wrong

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P1530

Type of error : Roll Over Sensor Position Wrong

(i) Information : Roll Over Sensor fault /Roll Over Sensor internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P1531 - ROLL OVER SENSOR

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1531	Roll Over Sensor	Roll Over Sensor Signal Struck

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P1531

Type of error : Roll Over Sensor Signal Struck

(i) Information : Roll Over Sensor fault /Roll Over Sensor internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P1532 - ROLL OVER SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1532	Roll Over Sensor	Roll Over Sensor Signal Wrong

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P1532

Type of error : Roll Over Sensor Signal Wrong

(i) Information : Roll Over Sensor fault /Roll Over Sensor internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P1533 - ROLL OVER SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1533	Roll Over Sensor	Roll Over Sensor Serial Peripheral Interface Wrong

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P1533

Type of error : Roll Over Sensor Serial Peripheral Interface Wrong

(i) Information : Roll Over Sensor fault /Roll Over Sensor internal fault

⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P1535 - ROLL OVER SENSOR

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1535	Roll Over Sensor	Roll Over Sensor Index Wrong

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P1535

Type of error : Roll Over Sensor Index Wrong

(i) Information : Roll Over Sensor fault /Roll Over Sensor internal fault

⚠ WARNING
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P1536 - ROLL OVER SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P1536	Roll Over Sensor	Roll Over Sensor Wrong Polarity

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

TROUBLE CODE : DTC CODE: P1536

Type of error : Roll Over Sensor Wrong Polarity

(i) Information : Roll Over Sensor fault /Roll Over Sensor internal fault

⚠ **WARNING**
The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient / surrounding temperature, whenever working on engine or exhaust systems.

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

c. Diagnostics

As this sensor is built in the ECU itself, Cannot be replaced as Standalone part, hence ECU to be replaced, Consult with the Royal Enfield team before proceeding for replacement of ECU.

P0500 - VEHICLE SPEED SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0500	Vehicle Speed Sensor	Vehicle Speed Sensor Front / Rear - Malfunction

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

This Error code will be displayed along with CAN Circuit malfunction only

TROUBLE CODE : DTC CODE: P0500

Type of error : Vehicle Speed Sensor Front / Rear - Malfunction

(i) Information : Vehicle Speed Sensor circuit fault / Vehicle Speed Sensor internal fault

b.Preliminary Checks (Basic Check Points):

⚠ **CAUTION**
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

- Along with this if CAN error is display rectify
  a. CAN circuit in the ECU Wiring Harness
  b. Check the ABS wiring harness

It is recommended to replace the CAN Circuit in ECU Wiring harness or the ABS Wiring harness after consulting Royal Enfield only.

P0501 - VEHICLE SPEED SENSOR
DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	P0501	Vehicle Speed Sensor	Vehicle Speed Sensor Front / Rear - No Signal

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

This Error code will be displayed along with CAN Circuit malfunction only

TROUBLE CODE : DTC CODE: P0501

Type of error : Vehicle Speed Sensor Front / Rear - No Signal

(i) Information : Vehicle Speed Sensor circuit fault / Vehicle Speed Sensor internal fault

b.Preliminary Checks (Basic Check Points):

⚠ CAUTION
Always switch OFF the Engine Kill switch & Ignition switch in OFF condition while checking the connections/ couplers

- Along with this if CAN error is display rectify
  a. CAN circuit in the ECU Wiring Harness
  b. Check the ABS wiring harness
  c. Check the ABS wiring harness

It is recommended to replace the CAN Circuit in ECU Wiring harness or the ABS Wiring harness after consulting Royal Enfield only.

U0009 - CAN CIRCUIT

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	U0009	CAN Circuit	CAN circuit Malfunction

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

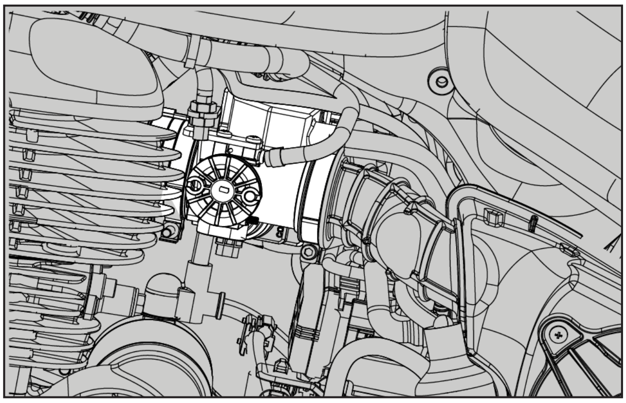
TROUBLE CODE : DTC CODE: U0009

Type of error : CAN Circuit Malfunction

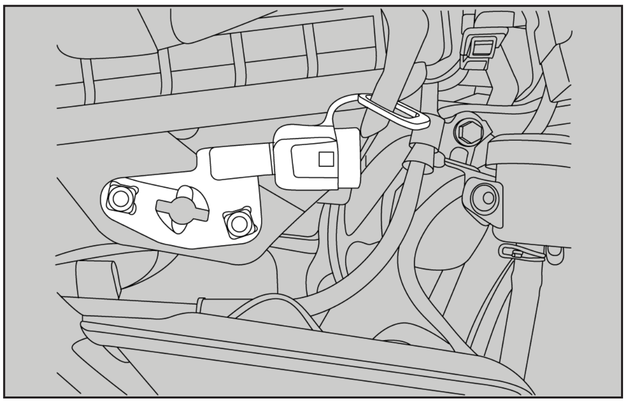
(i) Information : CAN circuit fault / CAN Circuit internal fault

b.Preliminary Checks (Basic Check Points):

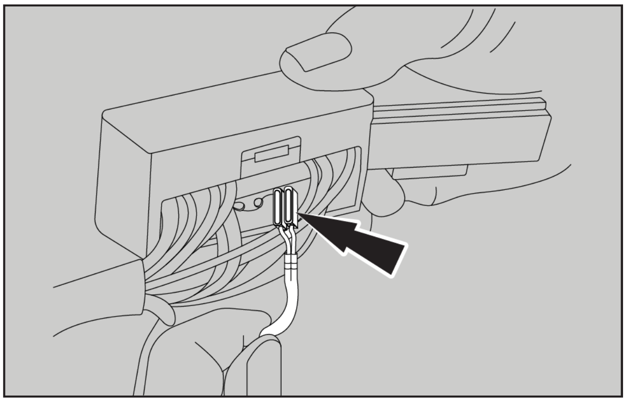
- ECU coupler is located in the Throttle body Assembly



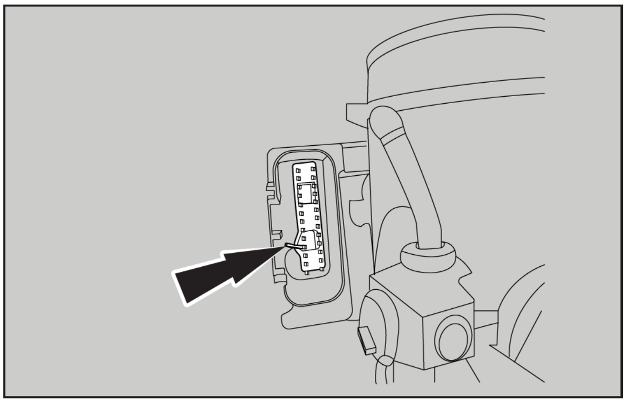
- Diagnosis coupler is located in the Right side panel



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab

" REFRESH DTC OPTION HAS TO APPEAR HERE"

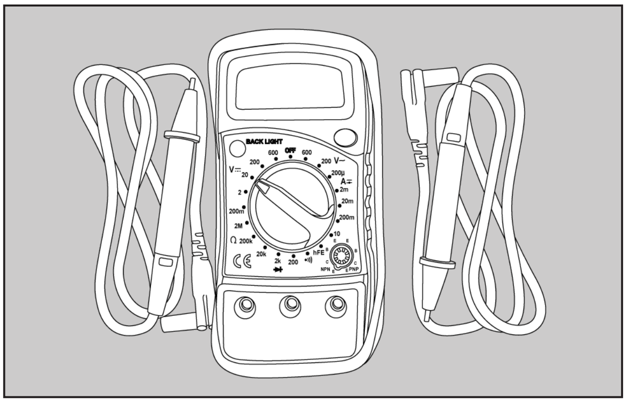
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

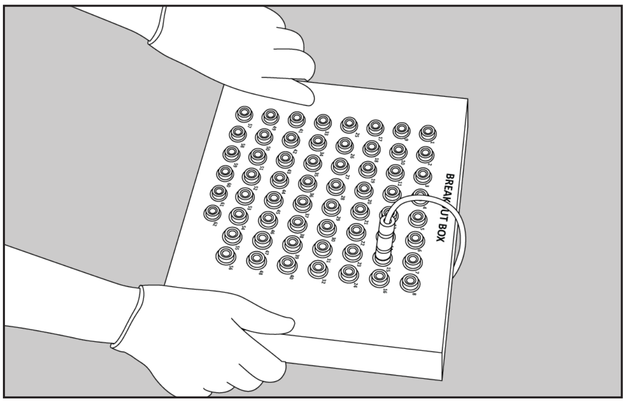
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

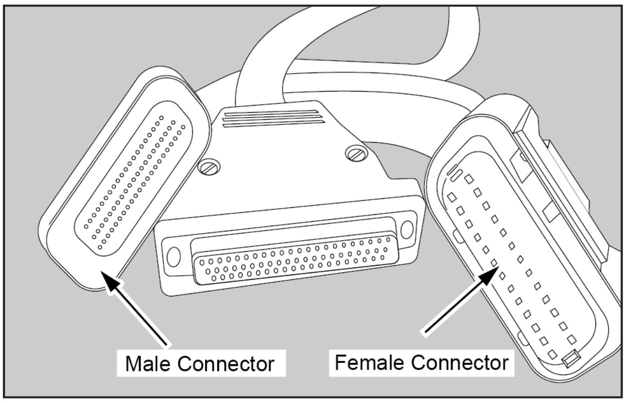
- **Tools Required**
- Multimeter (Universal)



- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

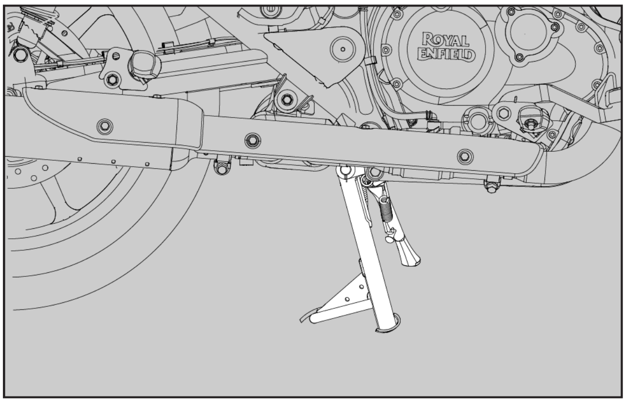

BREAKOUT BOX

- 26 Pin ECU Breakout Box Harness (ST30923/A)

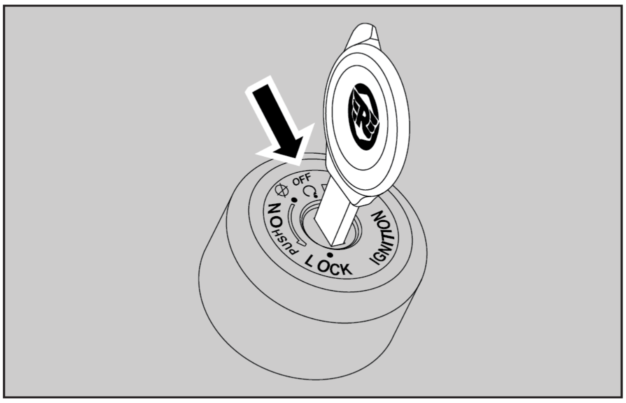

Male Connector
Female Connector

b. Pre-Checks:

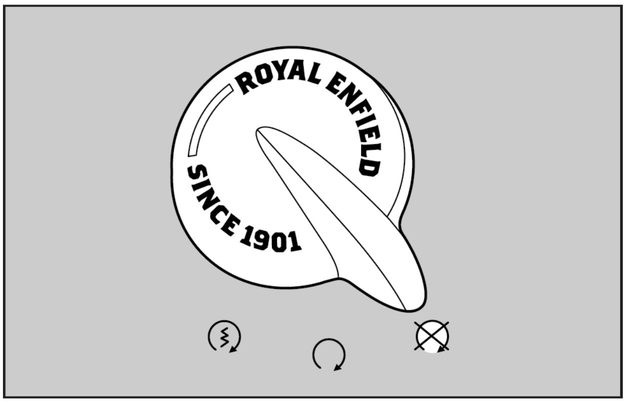
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
PUSH ON
LOCK
IGNITION

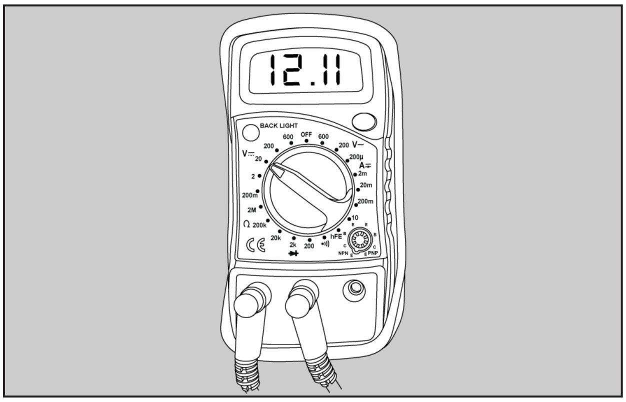
- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity


12.11
BACK LIGHT
OFF

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the diagnosis steps

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

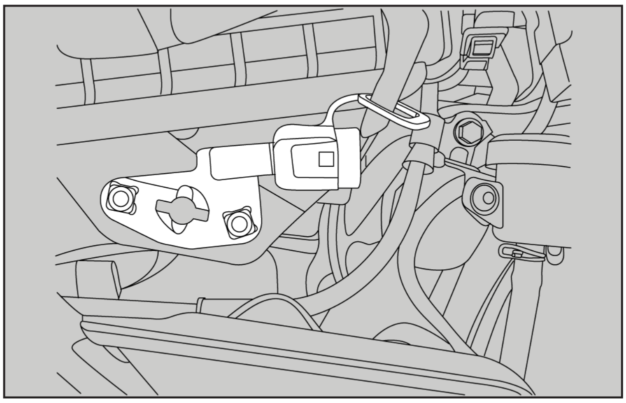
NOTE

- *Please remove right-side panel to locate the diagnostic coupler*

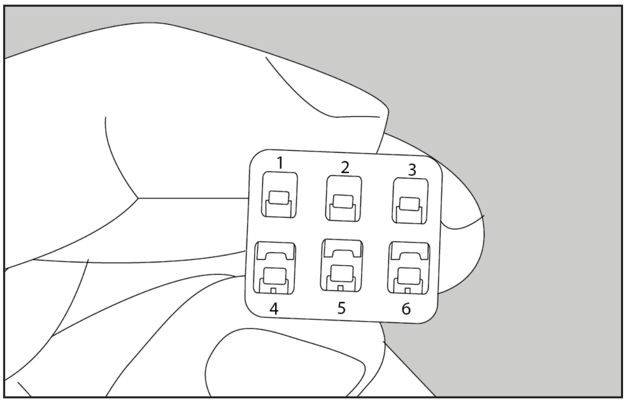
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Diagnosis coupler is located in the Right side panel



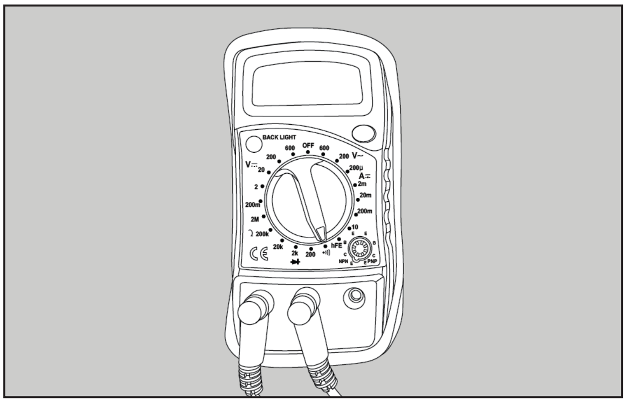
- Remove the rubber cap of the Diagnosis coupler



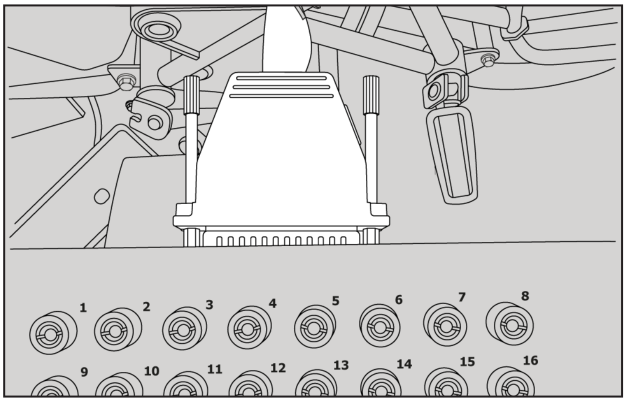
To check Continuity of the Wiring Harness

STEP 1:

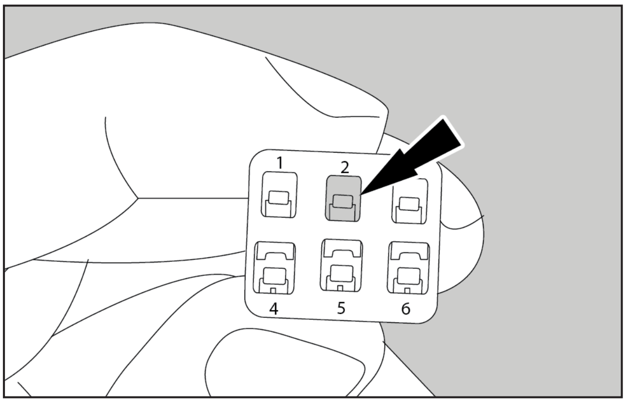
- Keep the multimeter in continuity mode

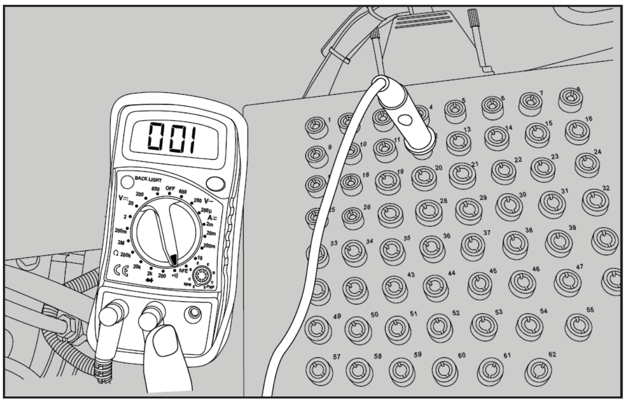


- Connect the ECU breakout box harness to ECU wiring harness coupler

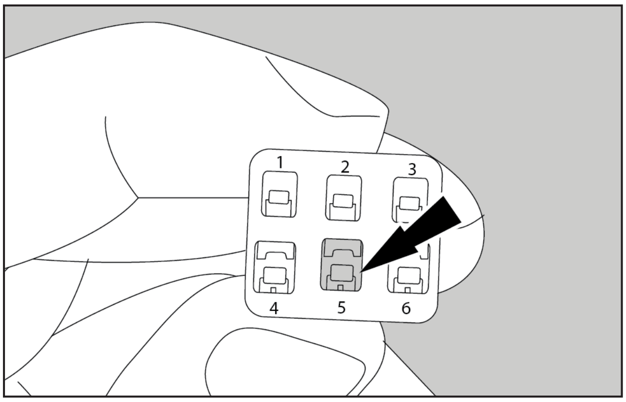


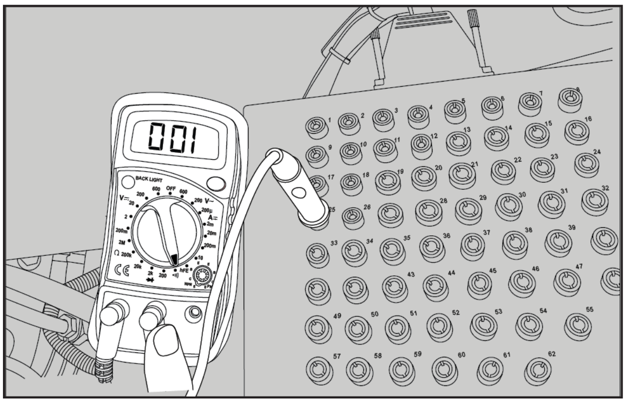
- Keep the multimeter positive probe in Pin 2 of the CAN socket and negative probe in socket 12 of the ECU breakout box check for continuity (beep sound from multimeter





- Keep the multimeter positive probe on Pin 5 of the CAN socket and negative probe on socket 25 of the ECU breakout box. To check continuity (Beep sound from the multimeter)





d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.

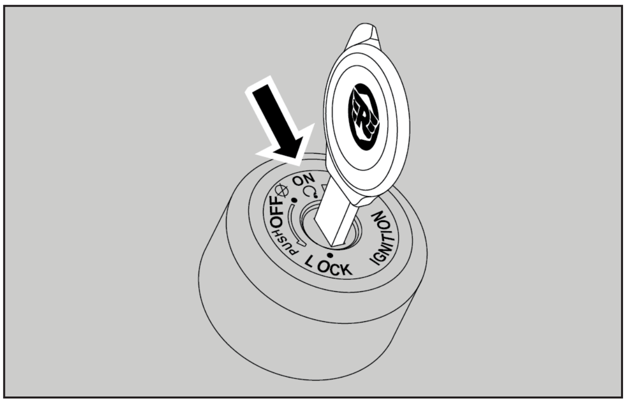
It is recommended to replace the CAN Circuit/ECU / Wiring Harness as per the advice from Royal Enfield only

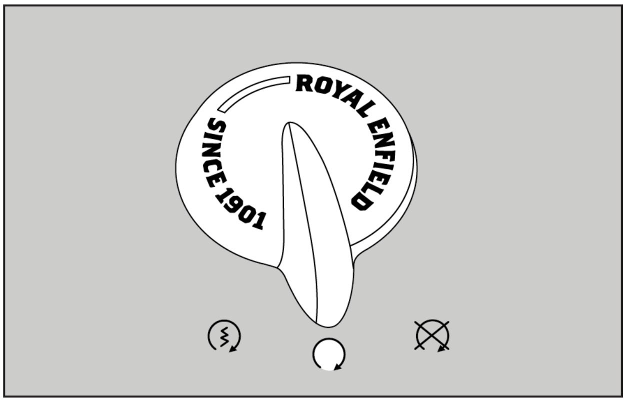
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

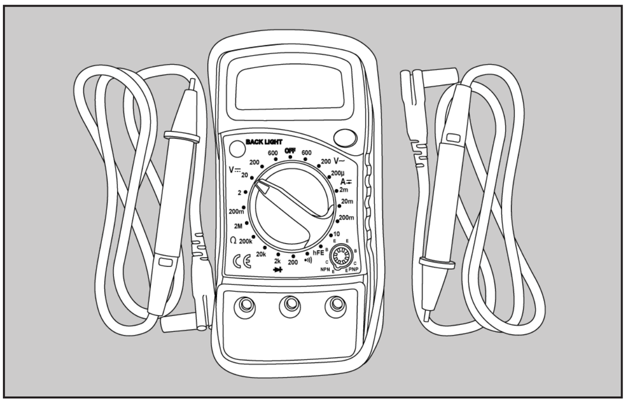
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

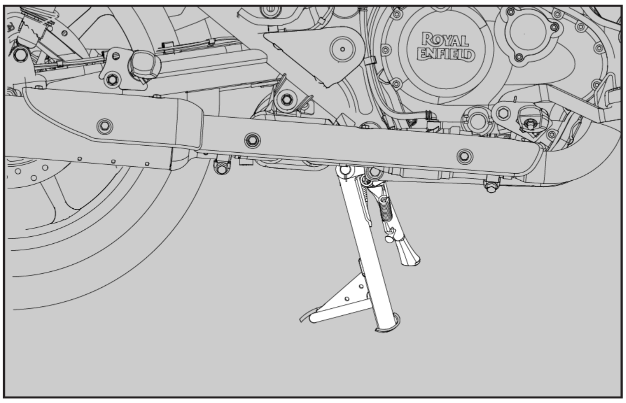
- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire are inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To use only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation any voltage fluctuation**
- **Do not disconnect and connect any sensor or ECU with ignition On**
- **With sensor connector disconnected and ignition is switched on, DTC will occur and need to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

Tools Required

- Multimeter (Universal)


BACK LIGHT
OFF
600
600
200
200
V
V
A
20
2
200m
2M
200k
20k
2k
200
200μ
2m
20m
200m
10
hFE
NPN
PNP

- Test lead wire(90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler

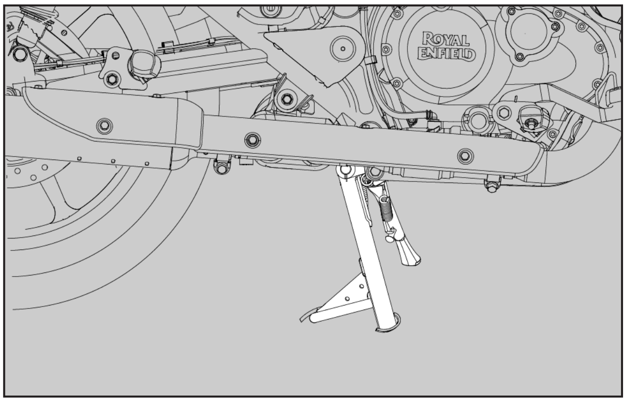

ROYAL
ENFIELD

Refer Chart for Color identification of Pins (hyperlink to be placed here)

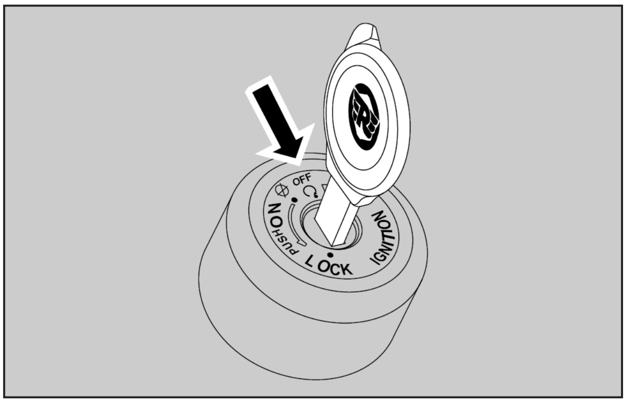
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

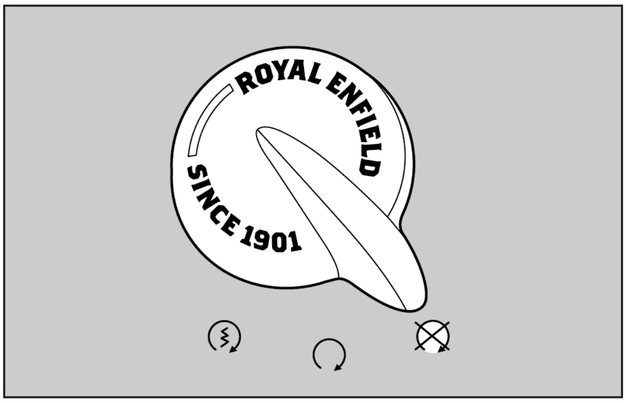
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

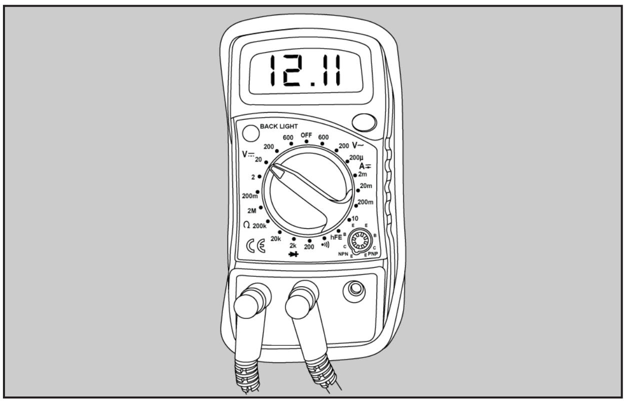


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the diagnosis steps

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers

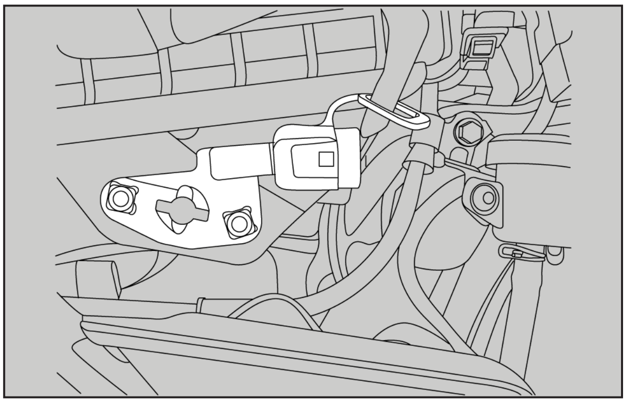
NOTE

- *Please remove right-side panel to locate the diagnostic coupler*

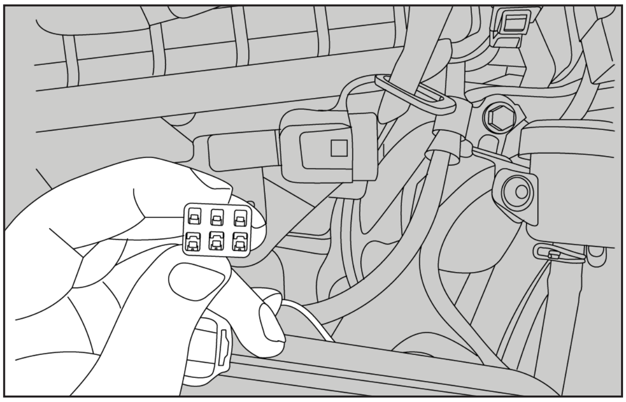
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Diagnosis coupler is located in the Right side panel



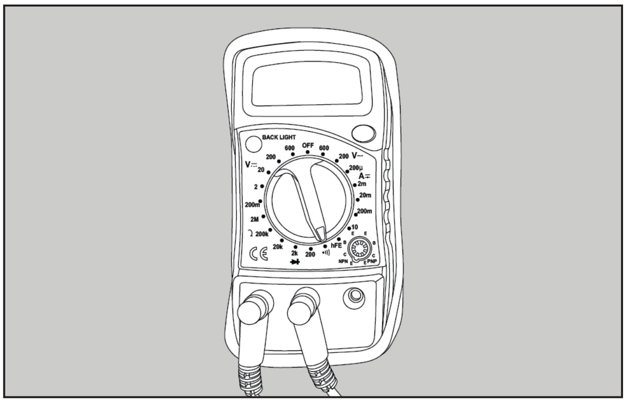
- Remove the rubber cap of the Diagnosis coupler



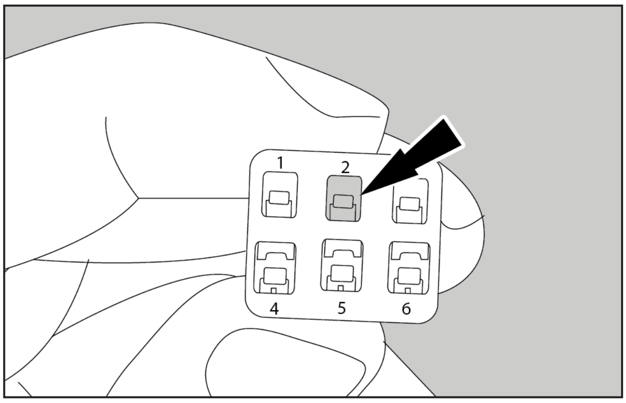
To check Continuity of the Wiring Harness

STEP 1:

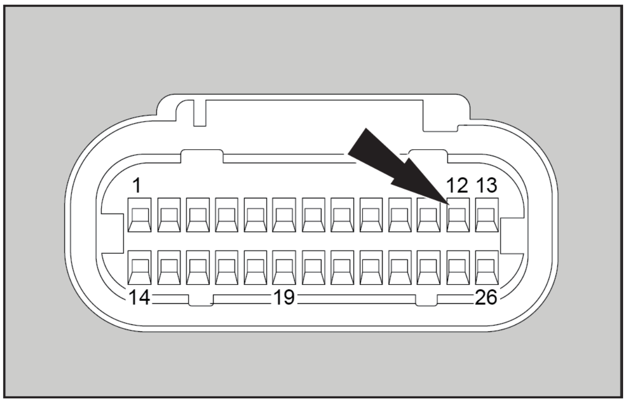
- Keep the multimeter in continuity mode



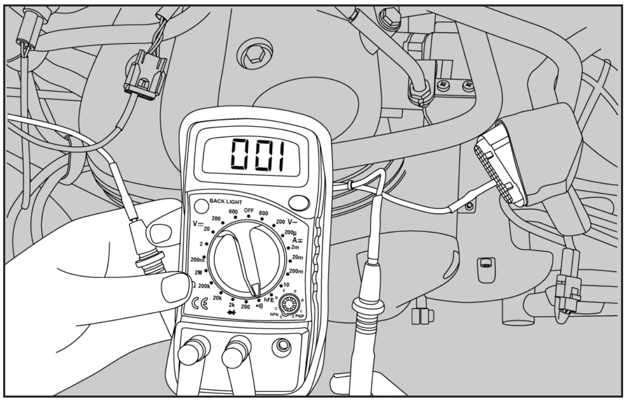
- Connect 90 series (Orange color) test lead wire with the black tag to pin 2 of the Diagnosis coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 12 of the ECU wiring harness coupler

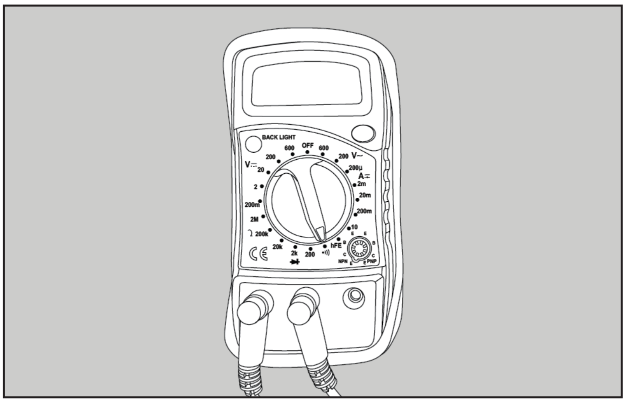


- Check for continuity (Beep sound from a multimeter)

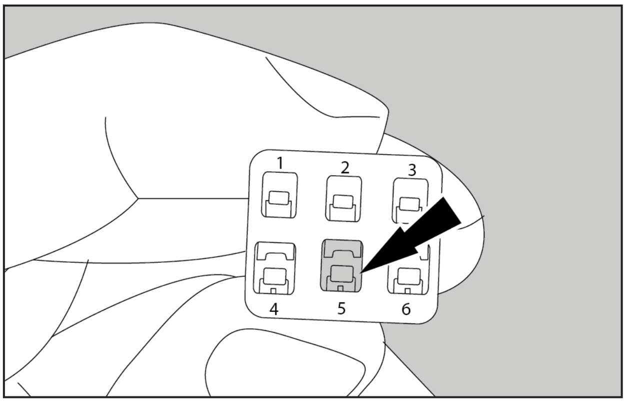


STEP 2:

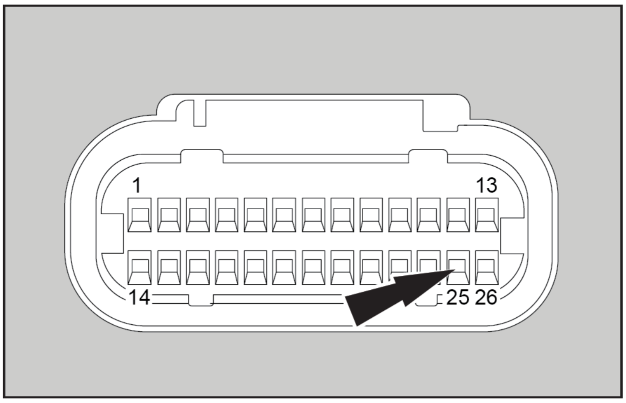
- Keep the multimeter in continuity mode



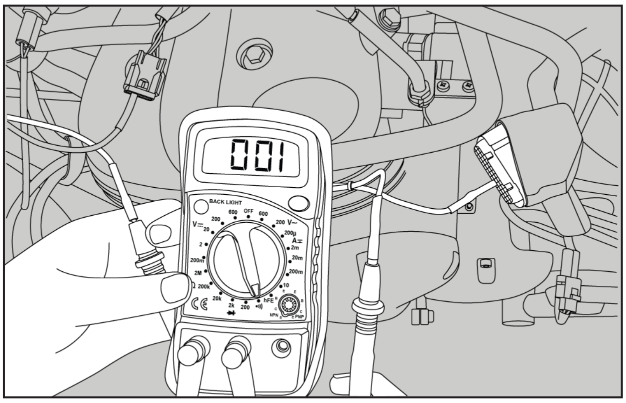
- Connect 90 series (Orange color) test lead wire with the white tag to pin 5 of the Diagnosis coupler.



- Connect 40 series (yellow color) test lead wire with the red tag to pin 25 of the ECU wiring harness coupler

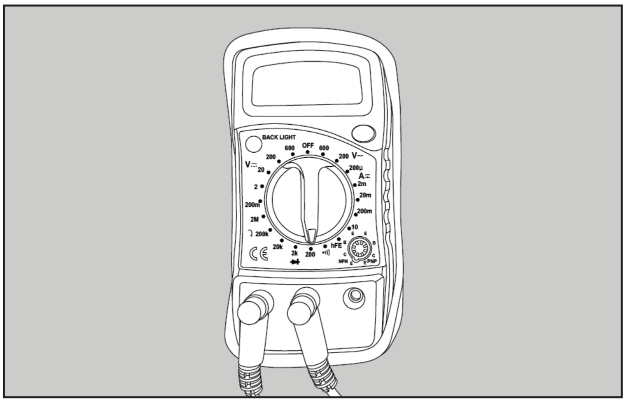


- Check for continuity (Beep sound from a multimeter)

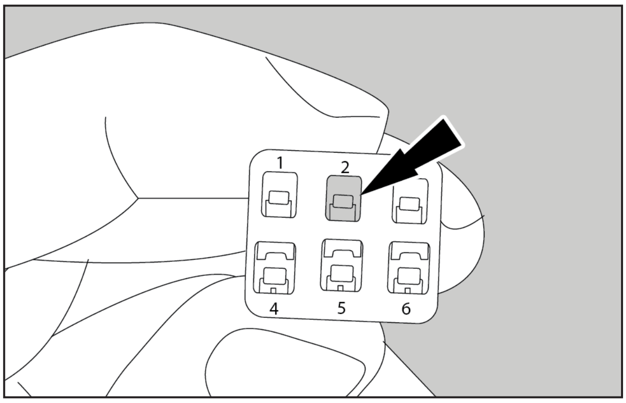


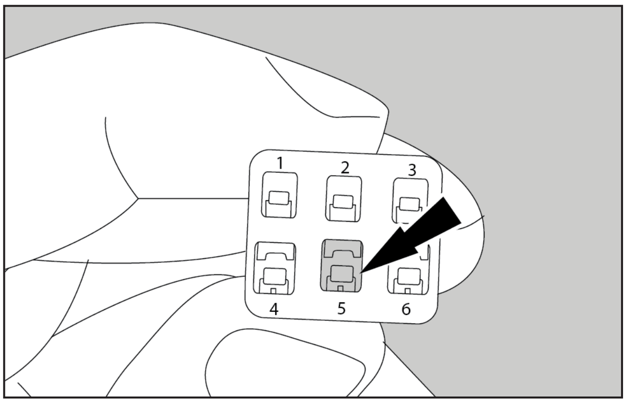
b. To check Resistance of the CAN Bus

- Keep the multimeter in resistance mode

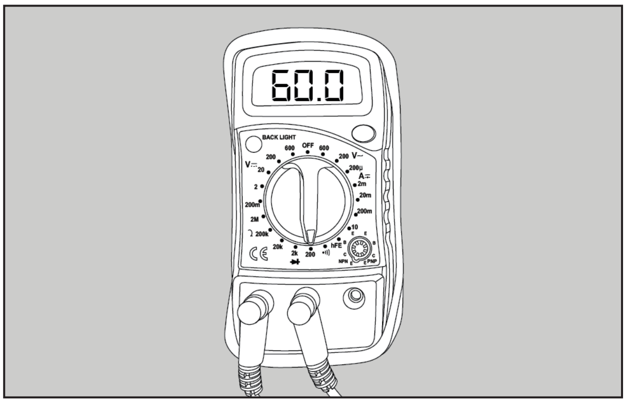


- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the Diagnosis coupler and connect test lead wire 90 series (Orange color) with the white tag to pin 5 of the Diagnosis coupler



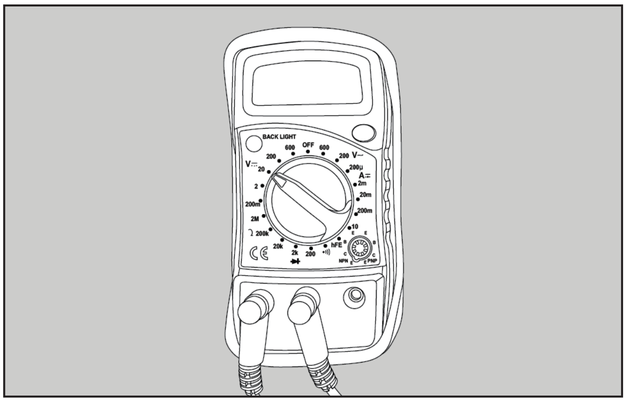


- Check the Resistance between Pin 2 and Pin 5. Resistance value to be 60 Ohms.

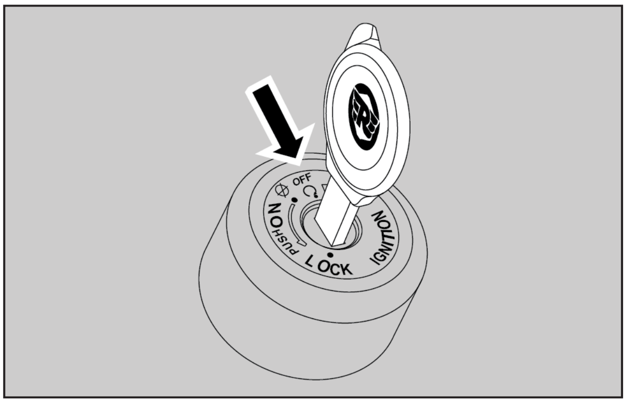


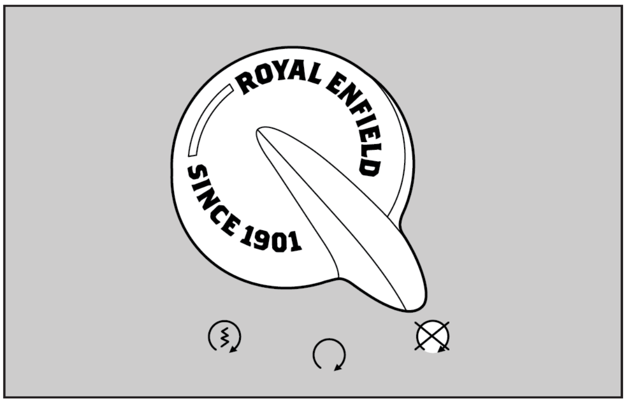
To check voltage:

- Keep the multimeter in Voltage mode (20 V)

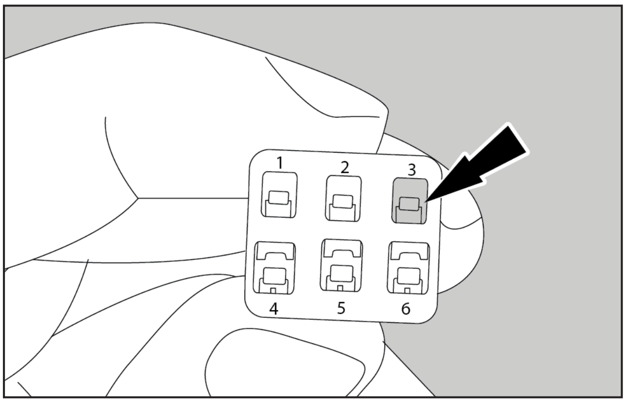


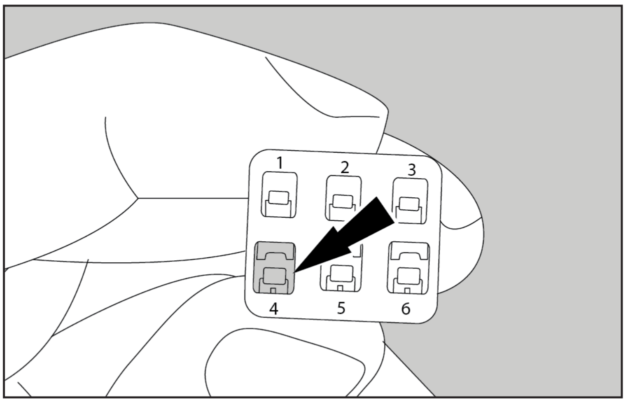
- Ensure Ignition & Kill Switch is in "ON" Position


OFF
PUSH ON
LOCK
IGNITION

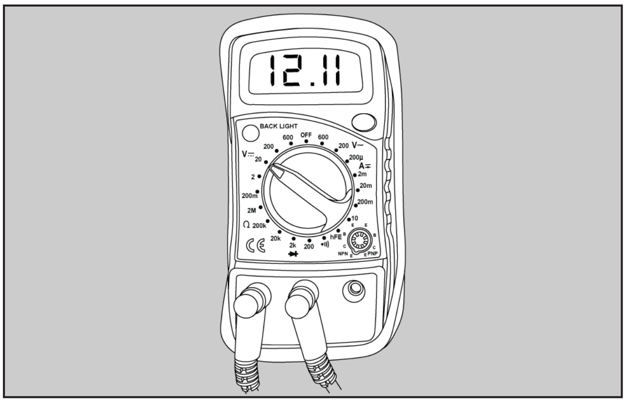

ROYAL ENFIELD
SINCE 1901

- Connect test lead wire 90 series (orange color) with the yellow tag to Pin 3 of the Diagnosis coupler and connect test lead wire 90 series (orange color) with the green tag to pin 4 of the Diagnosis coupler



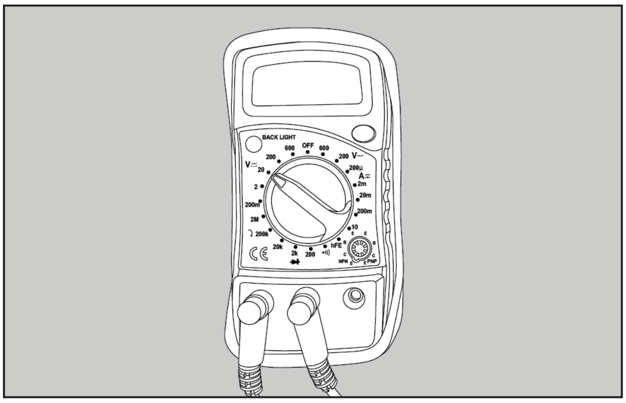


- Check the battery voltage, it should be 12 V

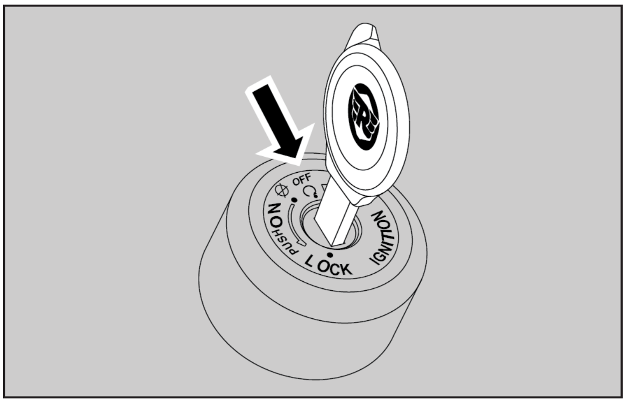

12.11
BACK LIGHT
OFF
V⎓
A⎓
hFE
NPN
PNP

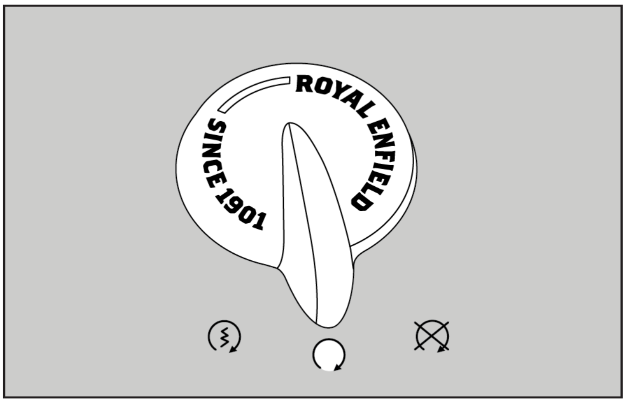
To check System voltage

- Keep the multimeter in voltage mode (20V)


BACK LIGHT
OFF
V⎓
A⎓
hFE
NPN
PNP

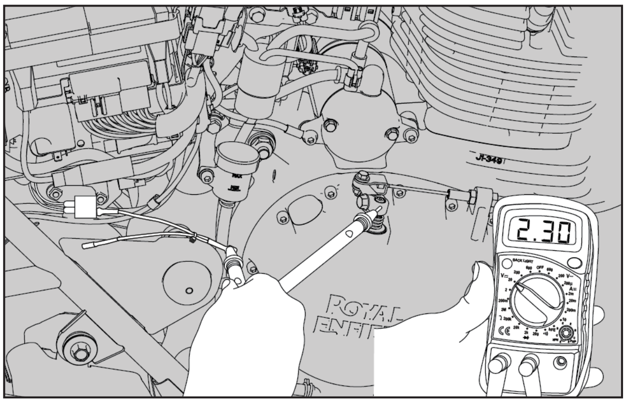
- Ensure Ignition & Kill Switch is in “ON” Position


OFF
PUSH ON
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

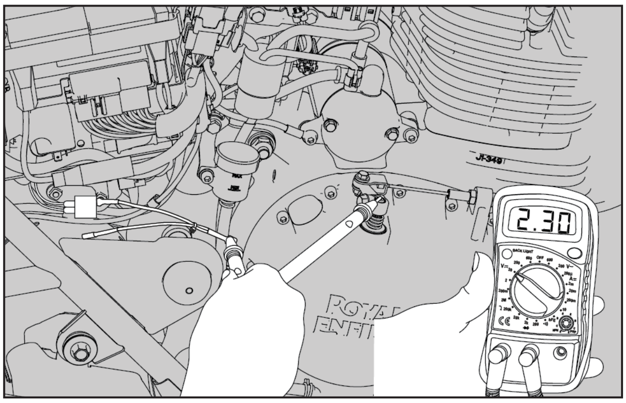
CAN High

- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the Diagnosis coupler and keep the multimeter positive probe in Pin 2 and negative probe in body ground, The Voltage should be 2 V to 4.5 V



CAN Low

- Connect test lead wire 90 series (orange color) with the white tag to Pin 5 of the Diagnosis coupler and keep the multimeter positive probe in Pin 5 and negative probe in body ground, The Voltage should be 0.5 V to 3 V



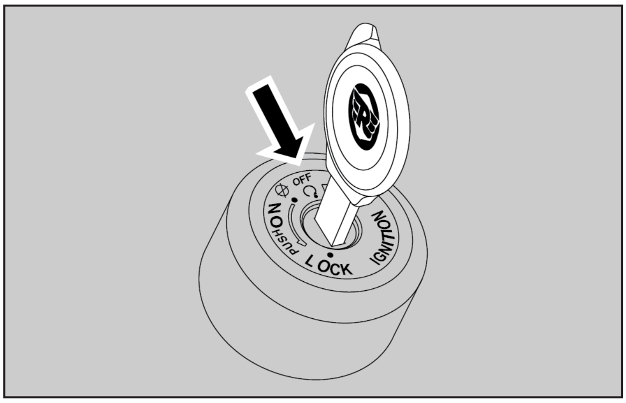
d. Decision Point:

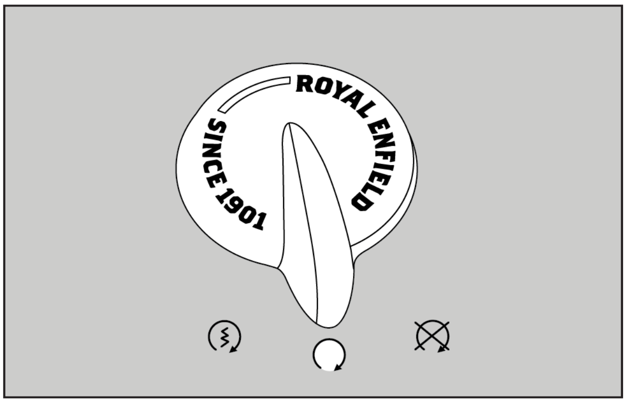
- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (60 ohms) you may replace the CAN Circuit
- If the voltage is meeting the specified limit, if resistance is between the specified limit and if continuity is available you have to replace the ECU.

It is recommended to replace the CAN Circuit/ECU / Wiring Harness as per the advice from Royal Enfield only

DTC Clearing Procedure:

- Ensure Ignition & Kill Switch is in “ON” Position





- Click on Erase DTC Icon
- Click yes to confirm to erase DTC’s
- Now it will appear as “NO DTC’s”, hence all the error logs cleared.
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle

U0121 - CAN CIRCUIT DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	U0121	CAN Circuit	CAN diagnosis error for defined transmitted message

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

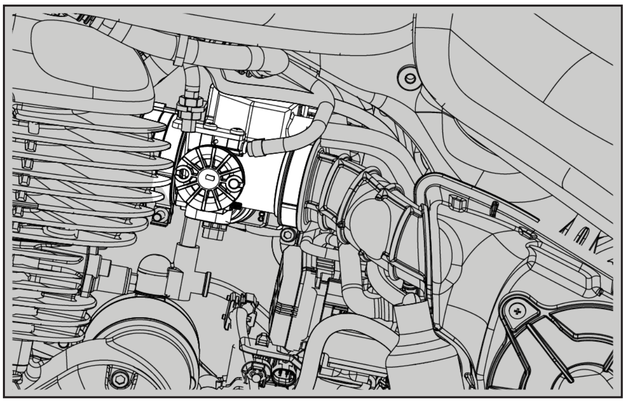
TROUBLE CODE : DTC CODE: U0121

Type of error : CAN Circuit Malfunction

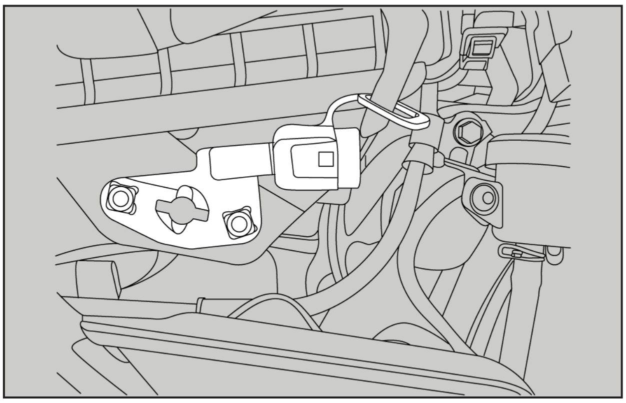
(i) Information : CAN circuit fault / CAN Circuit internal fault

b.Preliminary Checks (Basic Check Points):

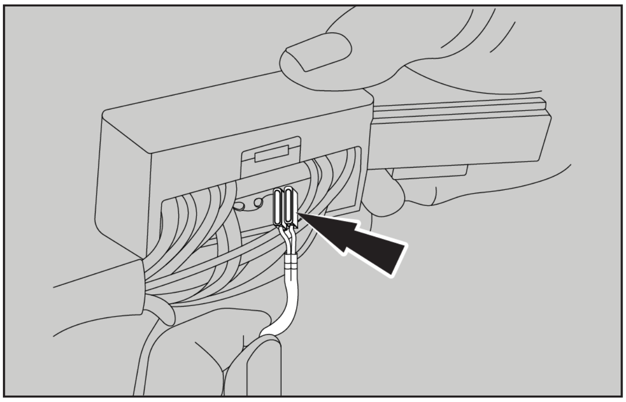
- ECU coupler is located in the Throttle body Assembly



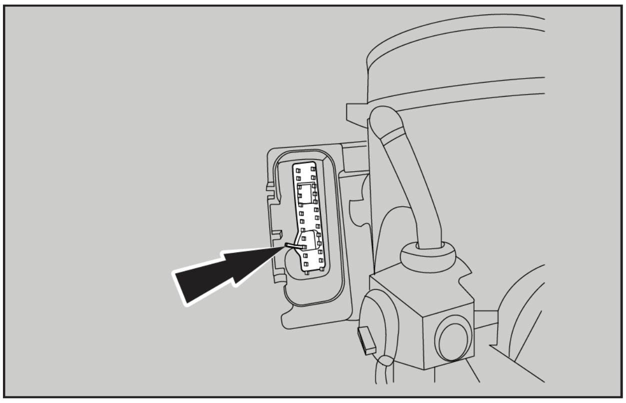
- Diagnosis coupler is located in the Right side panel



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab

" REFRESH DTC OPTION HAS TO APPEAR HERE"

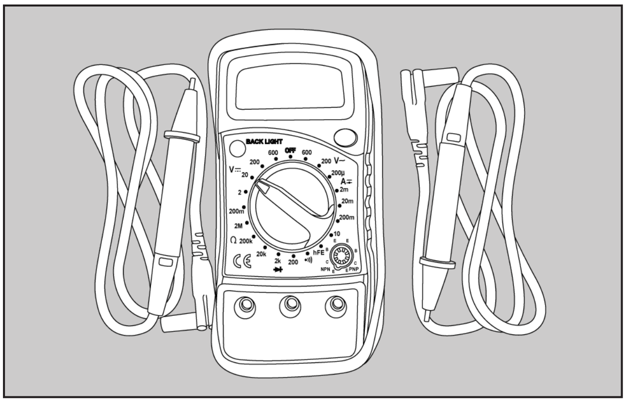
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

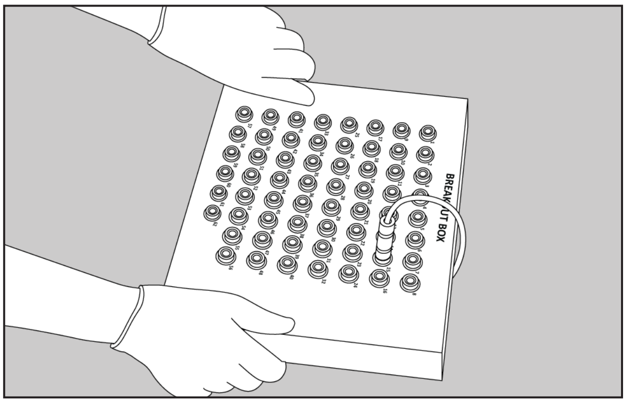
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

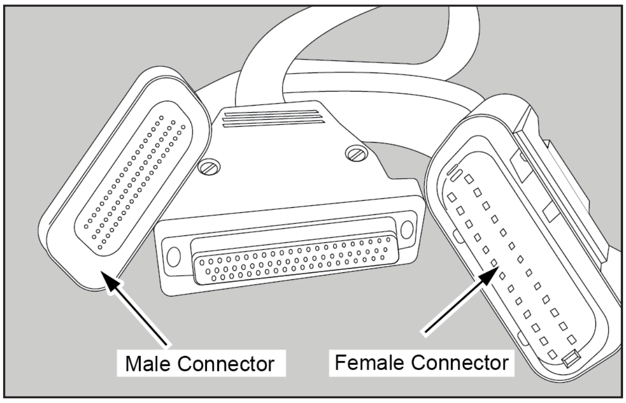
- **Tools Required**
- Multimeter (Universal)



- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

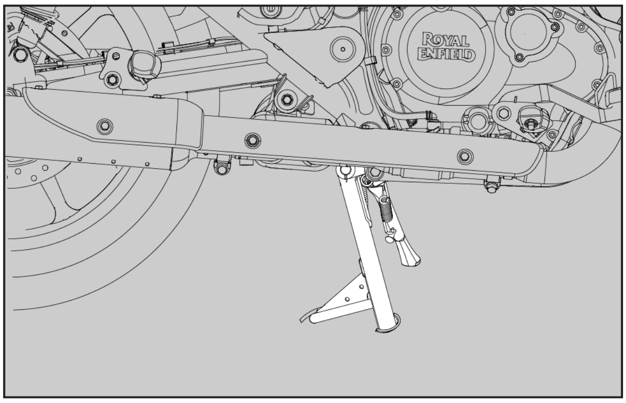

BREAKOUT BOX

- 26 Pin ECU Breakout Box Harness (ST30923/A)

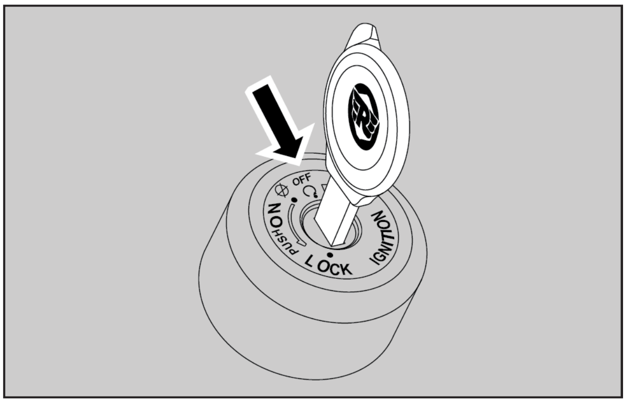

Male Connector
Female Connector

b. Pre-Checks:

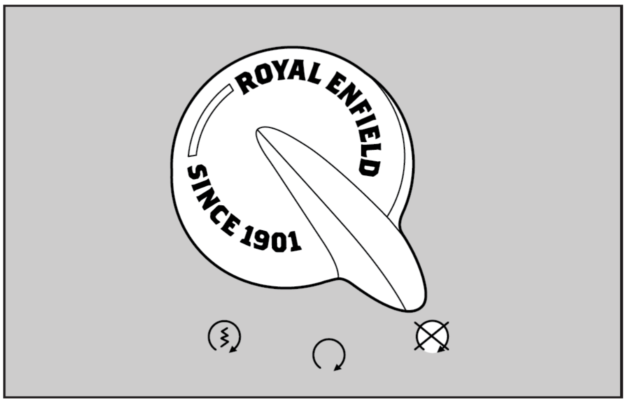
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in "OFF" condition


OFF
PUSH ON
LOCK
IGNITION

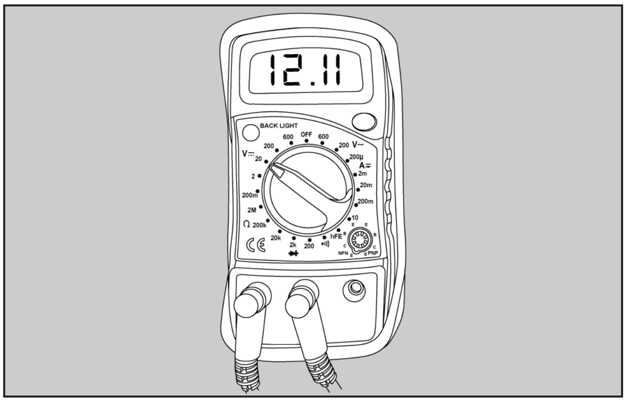
- Ensure the Kill Switch is in "OFF" condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity


12.11
BACK LIGHT

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the diagnosis steps

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

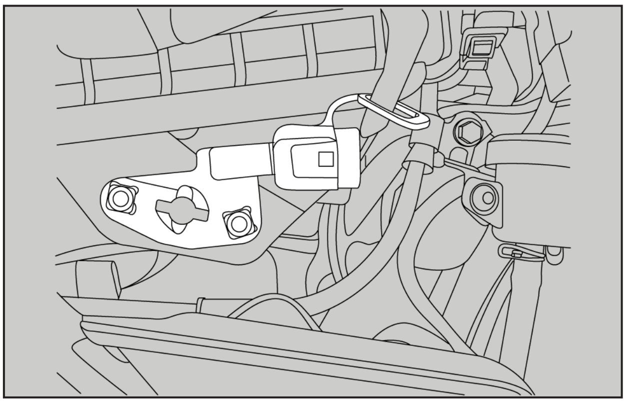
NOTE

- *Please remove right-side panel to locate the diagnostic coupler*

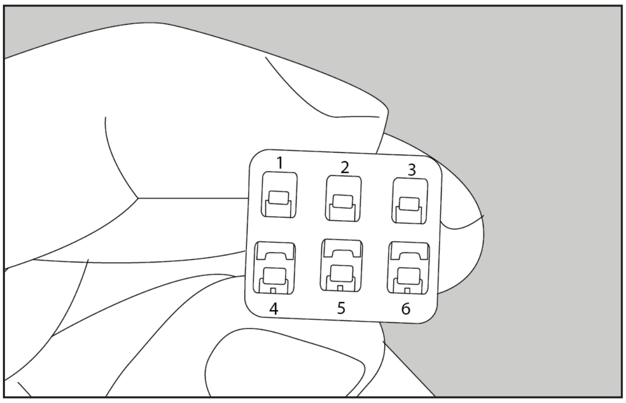
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Diagnosis coupler is located in the Right side panel



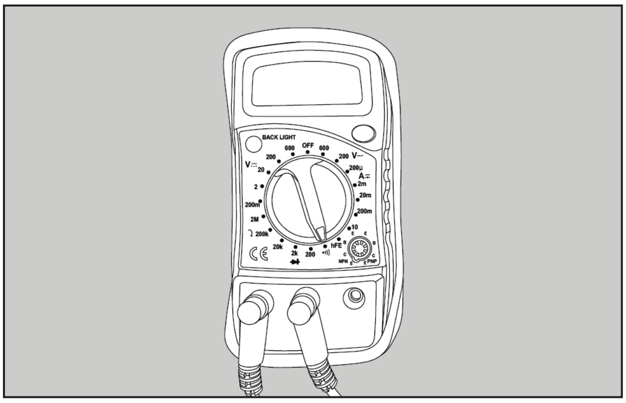
- Remove the rubber cap of the Diagnosis coupler



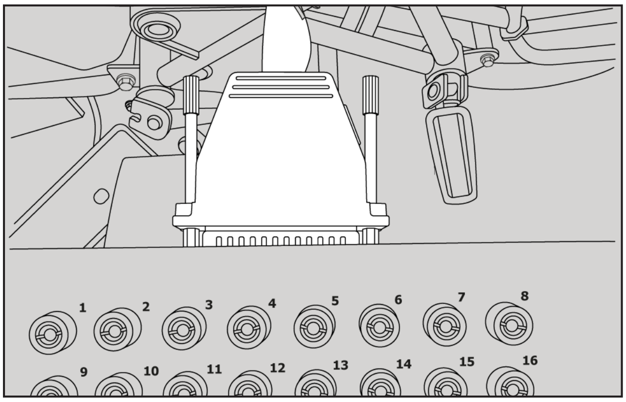
To check Continuity of the Wiring Harness

STEP 1:

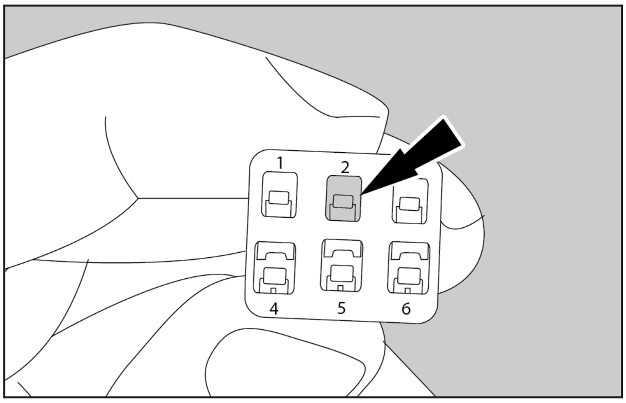
- Keep the multimeter in continuity mode

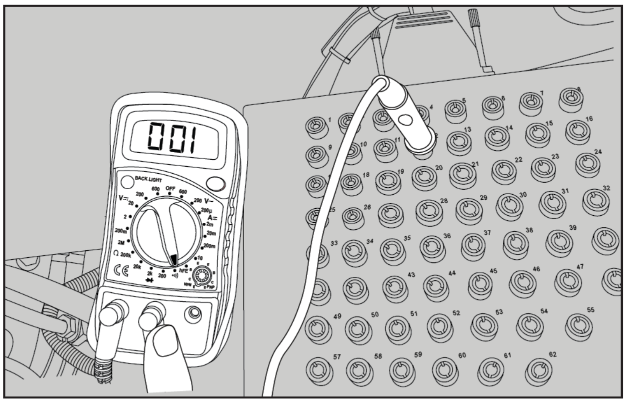


- Connect the ECU breakout box harness to ECU wiring harness coupler

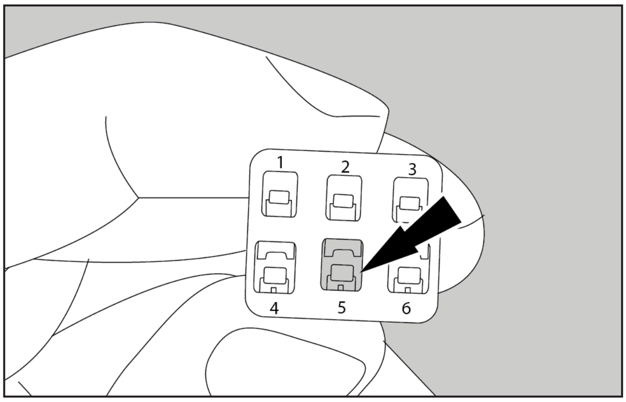


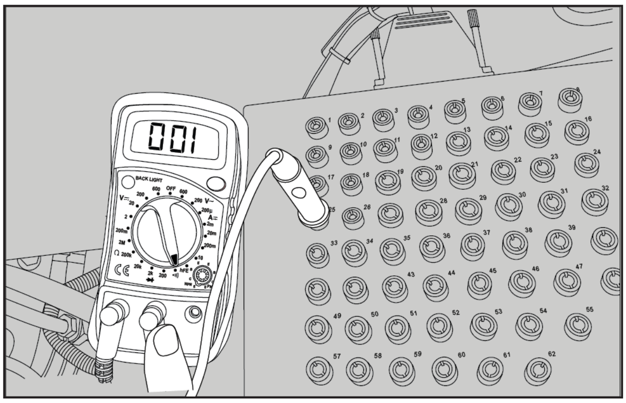
- Keep the multimeter positive probe in Pin 2 of the CAN socket and negative probe in socket 12 of the ECU breakout box check for continuity (beep sound from multimeter





- Keep the multimeter positive probe on Pin 5 of the CAN socket and negative probe on socket 25 of the ECU breakout box. To check continuity (Beep sound from the multimeter)





d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.

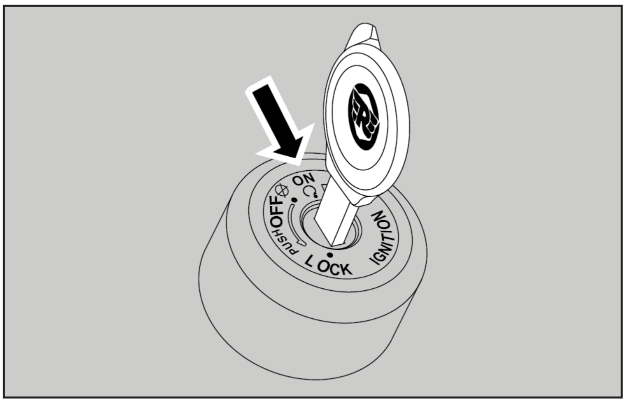
It is recommended to replace the CAN Circuit/ECU / Wiring Harness as per the advice from Royal Enfield only

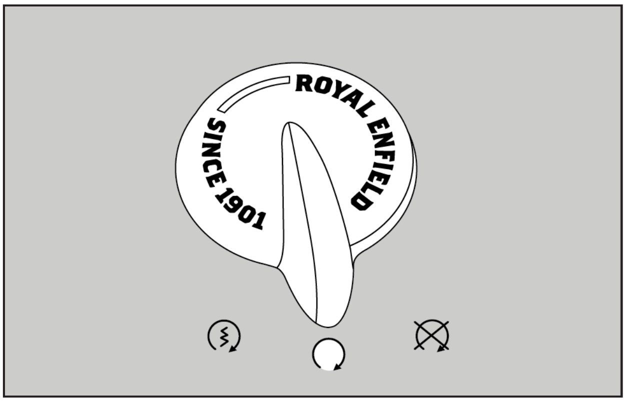
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

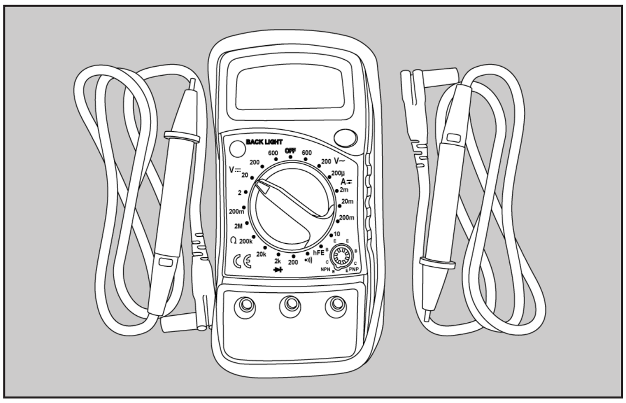
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire are inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To use only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation any voltage fluctuation**
- **Do not disconnect and connect any sensor or ECU with ignition On**
- **With sensor connector disconnected and ignition is switched on, DTC will occur and need to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

Tools Required

- Multimeter (Universal)


BACK LIGHT
OFF
600
600
200
200
V
20
2
200m
2M
200k
20k
2k
200
hFE
200μ
A
2m
20m
200m
10
NPN
PNP

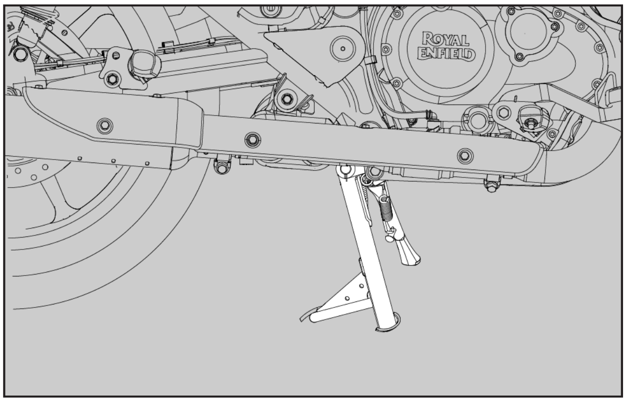
- Test lead wire(90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler

Refer Chart for Color identification of Pins (hyperlink to be placed here)

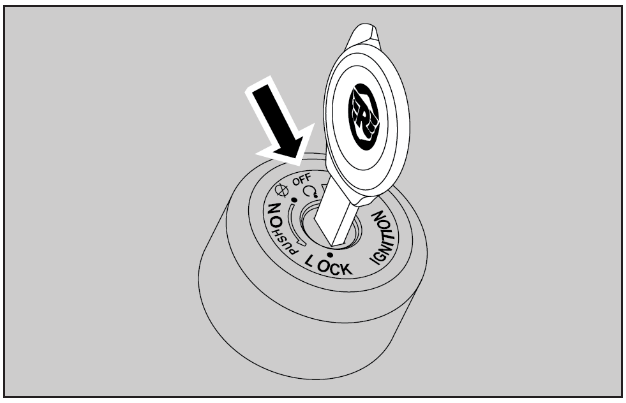
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	**Color**	**Test lead wire 1**	**Test lead wire 2**	**Test lead wire 3**	**Test lead wire 4**	**Test lead wire 5**	**Test lead wire 6**
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

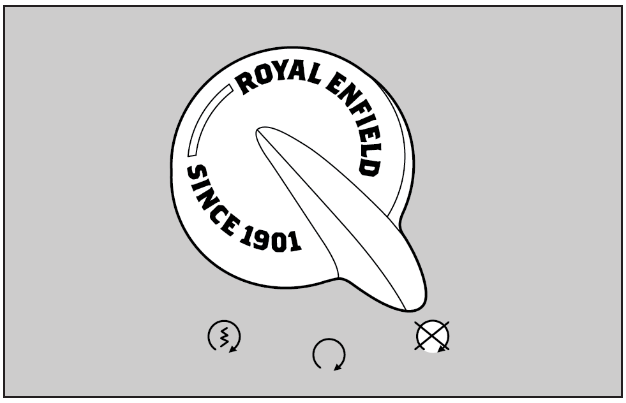
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

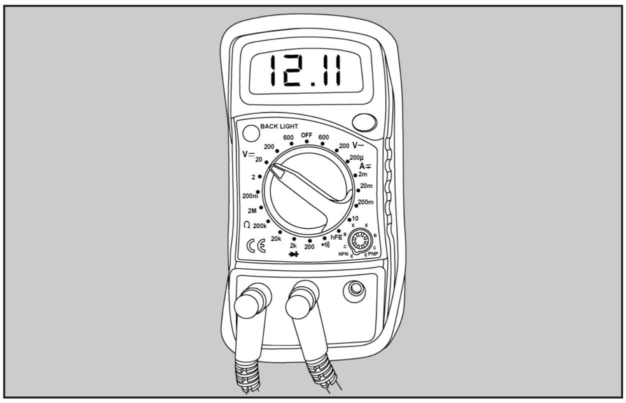


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the diagnosis steps

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers

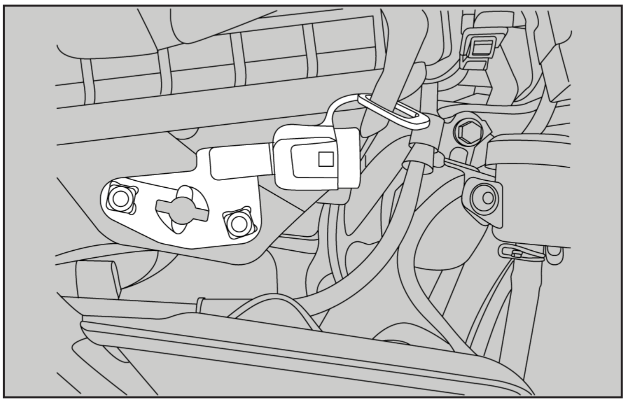
NOTE

- *Please remove right-side panel to locate the diagnostic coupler*

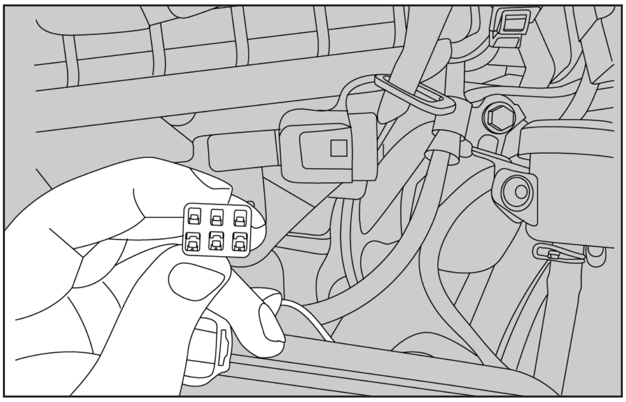
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Diagnosis coupler is located in the Right side panel



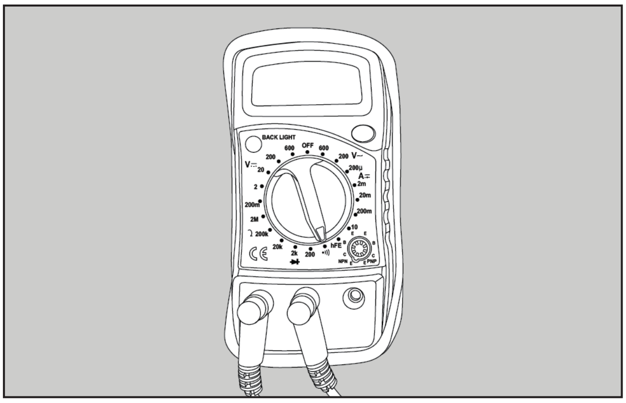
- Remove the rubber cap of the Diagnosis coupler



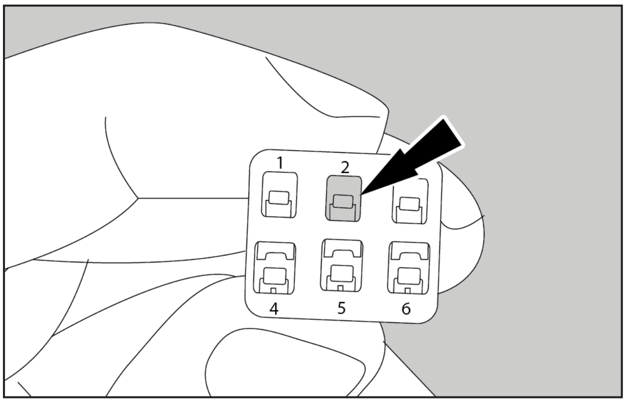
To check Continuity of the Wiring Harness

STEP 1:

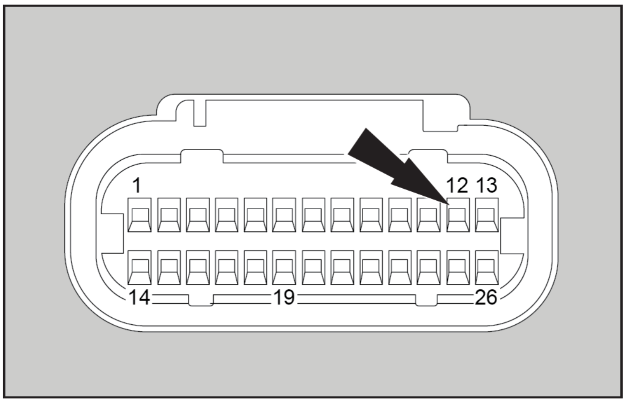
- Keep the multimeter in continuity mode



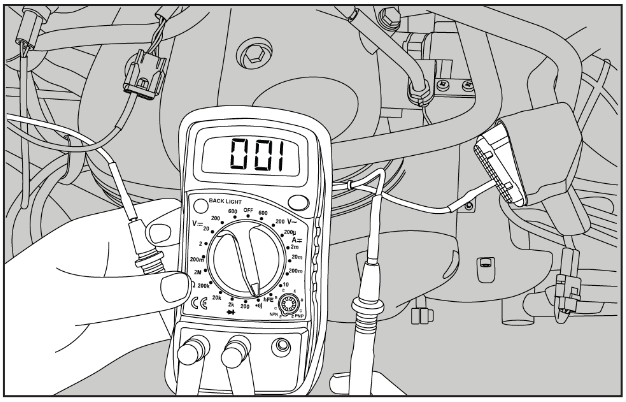
- Connect 90 series (Orange color) test lead wire with the black tag to pin 2 of the Diagnosis coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 12 of the ECU wiring harness coupler

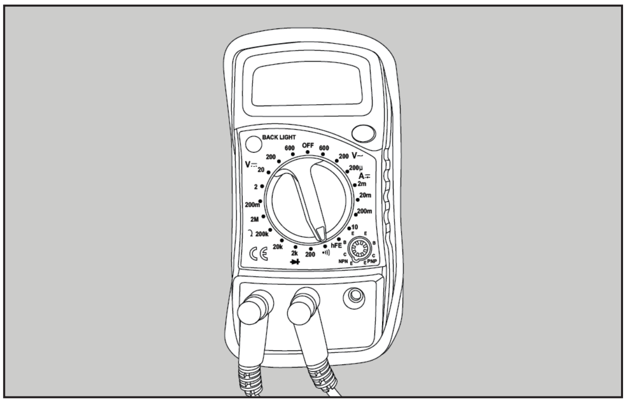


- Check for continuity (Beep sound from a multimeter)

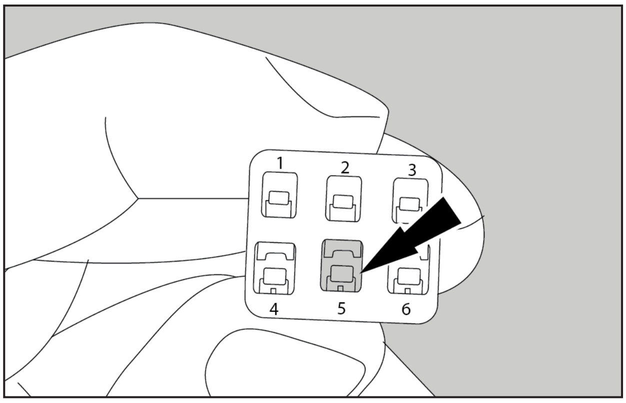


STEP 2:

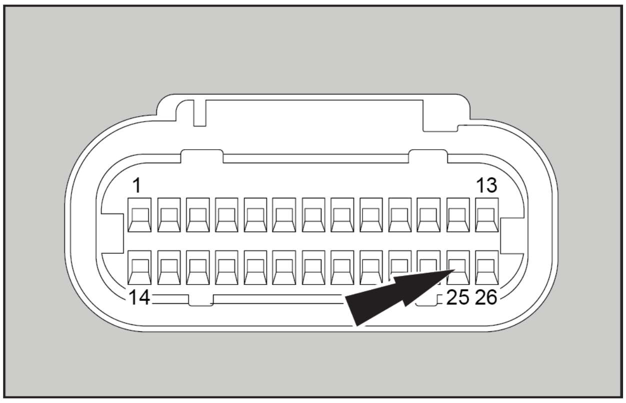
- Keep the multimeter in continuity mode



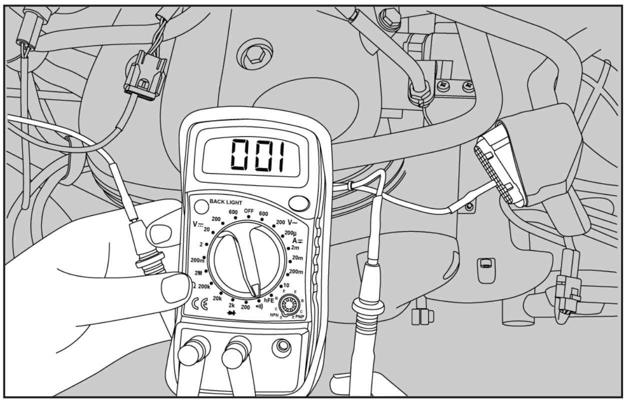
- Connect 90 series (Orange color) test lead wire with the white tag to pin 5 of the Diagnosis coupler.



- Connect 40 series (yellow color) test lead wire with the red tag to pin 25 of the ECU wiring harness coupler

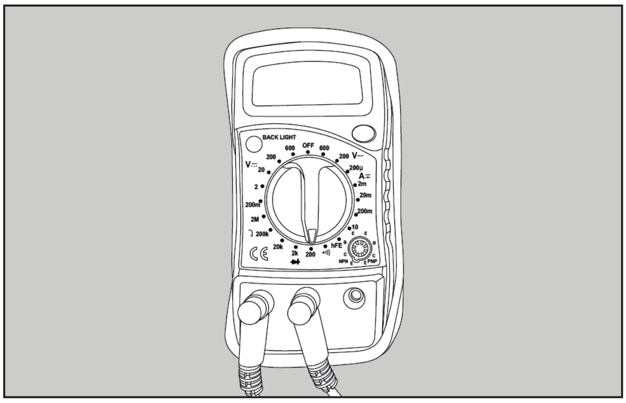


- Check for continuity (Beep sound from a multimeter)

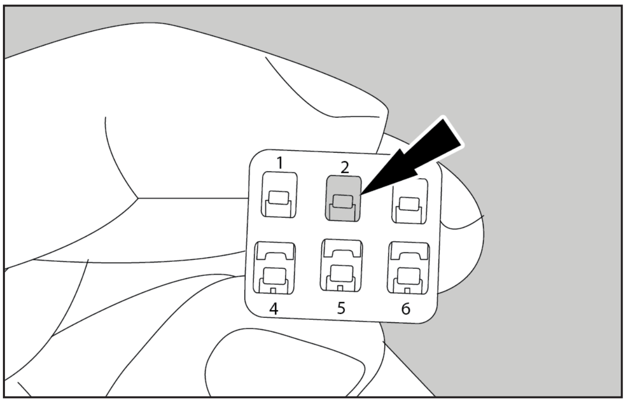


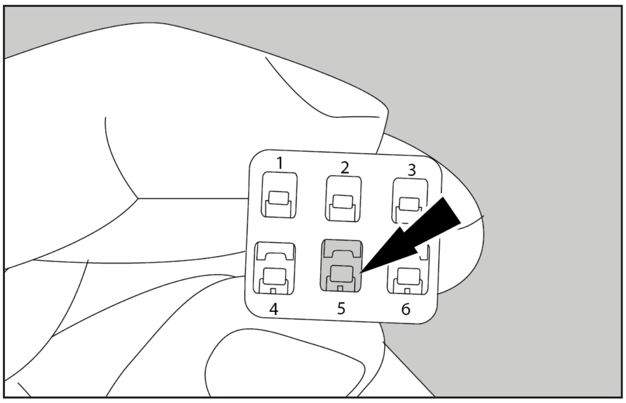
b. To check Resistance of the CAN Bus

- Keep the multimeter in resistance mode

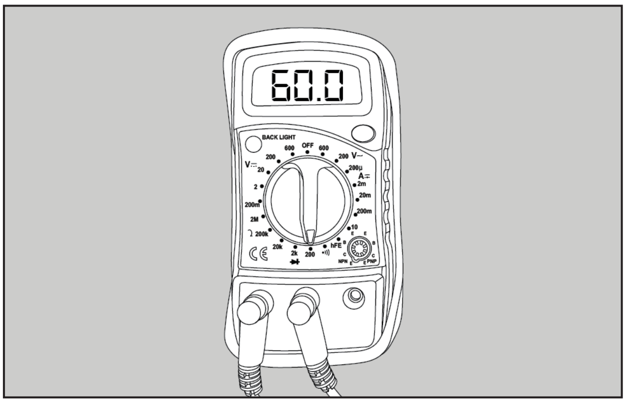


- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the Diagnosis coupler and connect test lead wire 90 series (Orange color) with the white tag to pin 5 of the Diagnosis coupler



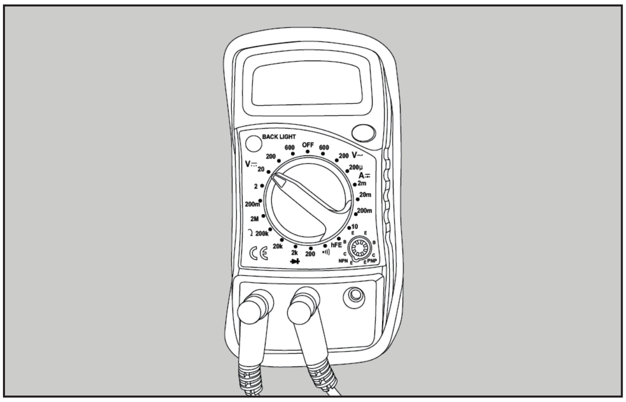


- Check the Resistance between Pin 2 and Pin 5. Resistance value to be 60 Ohms.

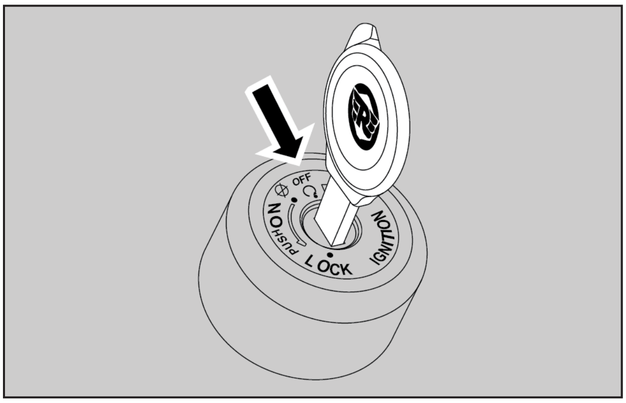

60.0
BACK LIGHT
OFF

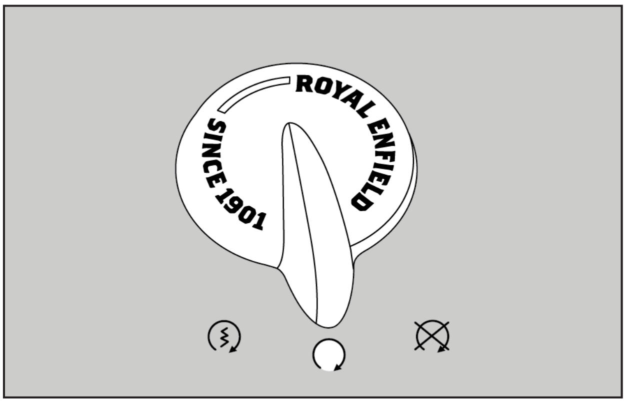
To check voltage:

- Keep the multimeter in Voltage mode (20 V)

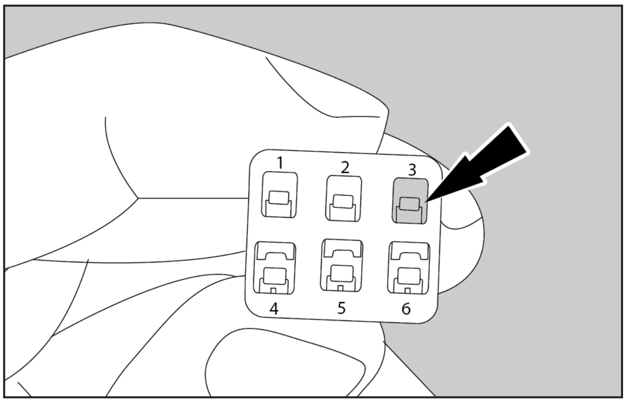

BACK LIGHT
OFF

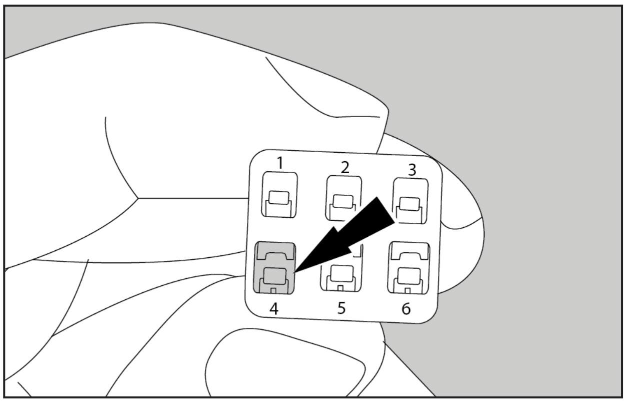
- Ensure Ignition & Kill Switch is in “ON” Position


OFF
PUSH ON
LOCK
IGNITION

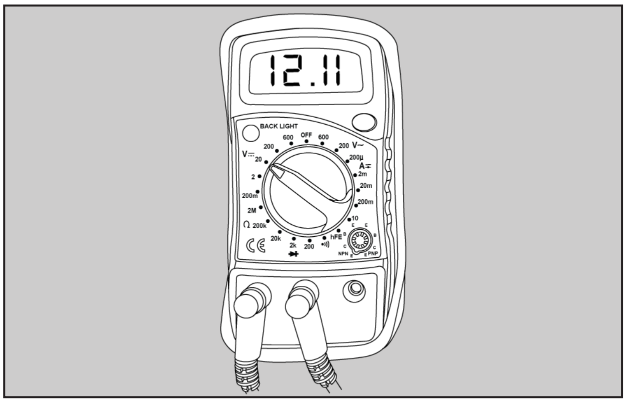

ROYAL ENFIELD
SINCE 1901

- Connect test lead wire 90 series (orange color) with the yellow tag to Pin 3 of the Diagnosis coupler and connect test lead wire 90 series (orange color) with the green tag to pin 4 of the Diagnosis coupler



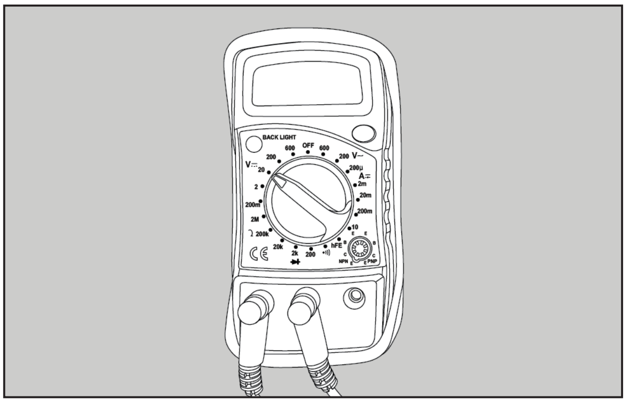


- Check the battery voltage, it should be 12 V

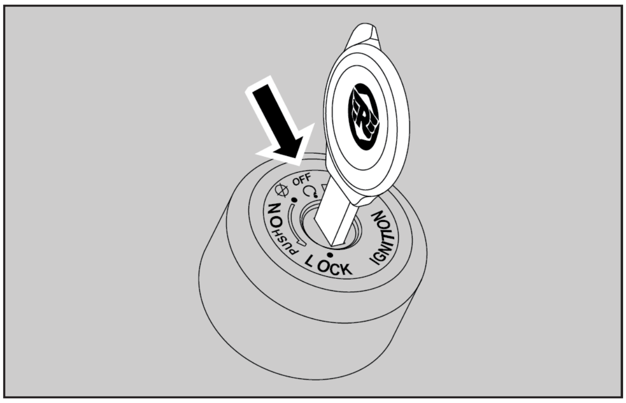

12.11
BACK LIGHT
OFF

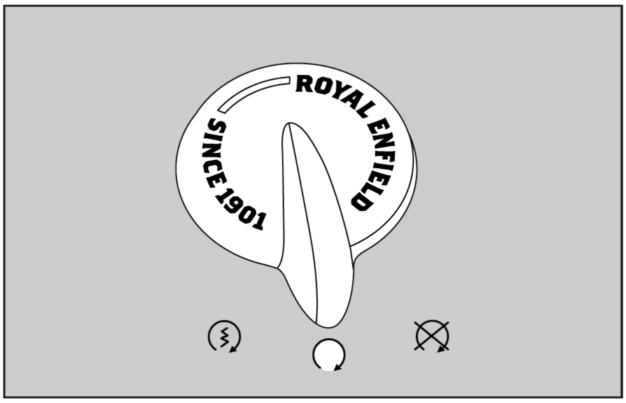
To check System voltage

- Keep the multimeter in voltage mode (20V)


BACK LIGHT
OFF

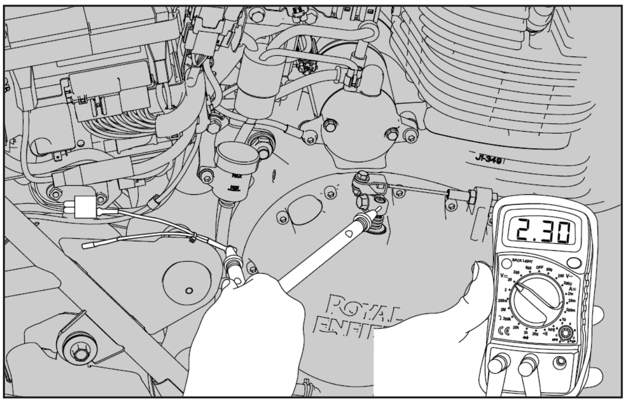
- Ensure Ignition & Kill Switch is in “ON” Position


OFF
PUSH ON
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

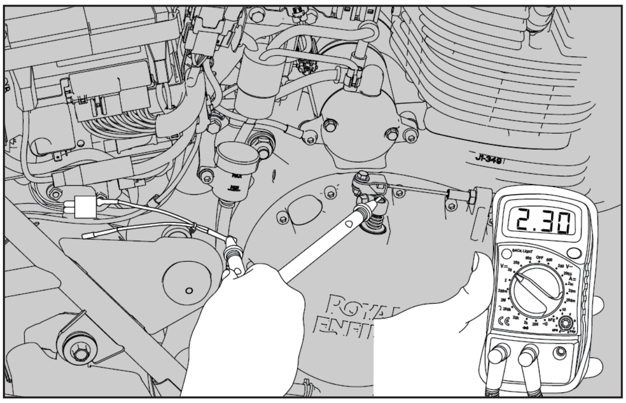
CAN High

- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the Diagnosis coupler and keep the multimeter positive probe in Pin 2 and negative probe in body ground, The Voltage should be 2 V to 4.5 V



CAN Low

- Connect test lead wire 90 series (orange color) with the white tag to Pin 5 of the Diagnosis coupler and keep the multimeter positive probe in Pin 5 and negative probe in body ground, The Voltage should be 0.5 V to 3 V



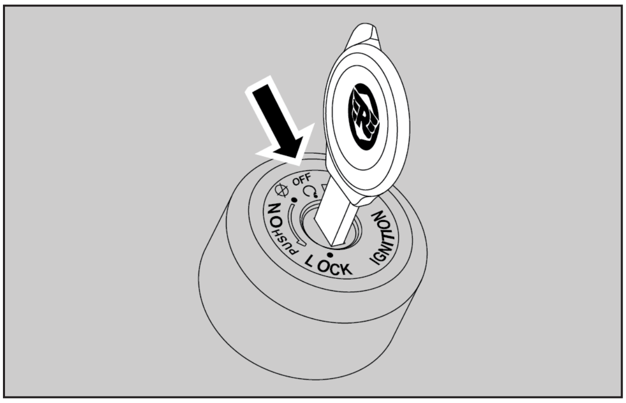
d. Decision Point:

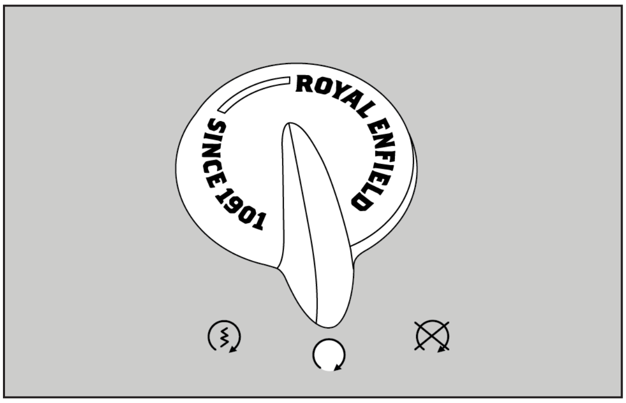
- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (60 ohms) you may replace the CAN Circuit
- If the voltage is meeting the specified limit, if resistance is between the specified limit and if continuity is available you have to replace the ECU.

It is recommended to replace the CAN Circuit/ECU / Wiring Harness as per the advice from Royal Enfield only

DTC Clearing Procedure:

- Ensure Ignition & Kill Switch is in "ON" Position





- Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle

U0415 - CAN CIRCUIT

DIAGNOSTICS PROCEDURE

1. Live Dtc Codes

1.1. List Of Dtc Codes (P Codes)

The below table is for internal reference only and not for APP consumption

Sl. No.	Error Code	Component	Error Description as per DOL
1	U0415	CAN Circuit	CAN diagnosis error for defined received message

NOTE
• *First please save the freeze frame data before starting the analysis / erasing DTC, by clicking on freeze frame tab*

- **Procedure for selected DTC**

a. Error Description:

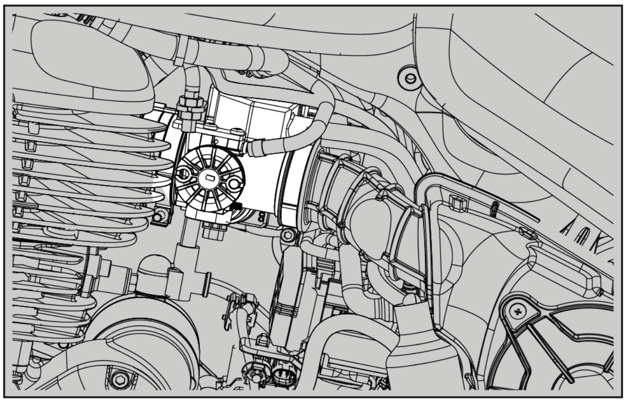
TROUBLE CODE : DTC CODE: U0415

Type of error : CAN diagnosis error for defined received message

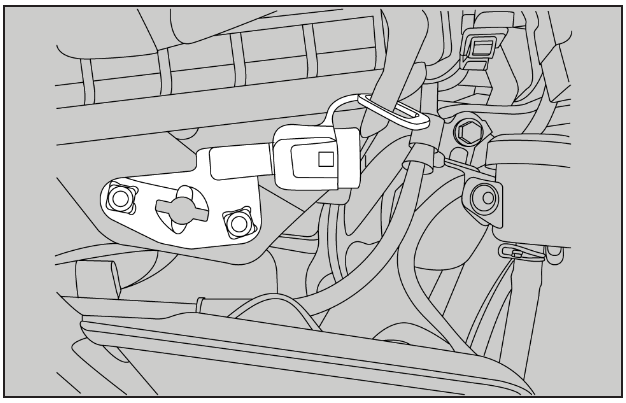
(i) Information : CAN circuit fault / CAN Circuit internal fault (Suggested Simple Description)

b.Preliminary Checks (Basic Check Points):

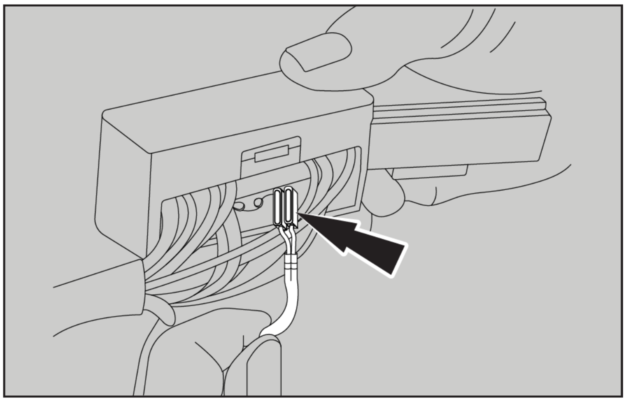
- ECU coupler is located in the Throttle body Assembly



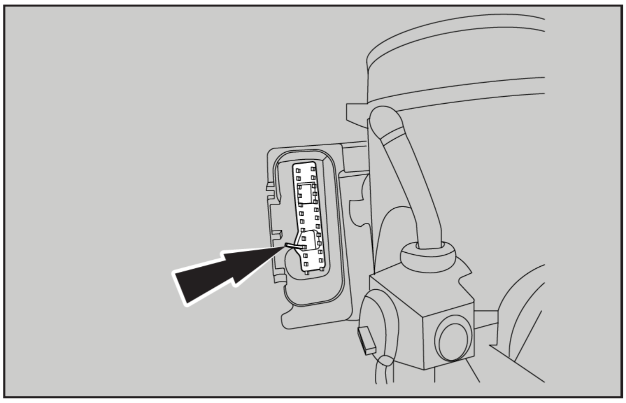
- Diagnosis coupler is located in the Right side panel



- Ensure there is no loose connection of the coupler or pin back out from the coupler, if found please fix it properly again



- Ensure there is no bend or deformation on the pin of the ECU and Sensor couplers, if found change the sensor or ECU and fix it back again.



- Ensure that there is no wire damage/cut/tamper in the corresponding parts. If damage found please replace the respective part.

It is recommended to replace the sensor /ECU as per the advice from Royal Enfield only.

Once after fixing the DTC make the Ignition cycle (3 times - Ignition "ON" & "OFF") till the MIL is OFF) to make this DTC error appear as history and Refresh the DTC by clicking the below tab

" REFRESH DTC OPTION HAS TO APPEAR HERE"

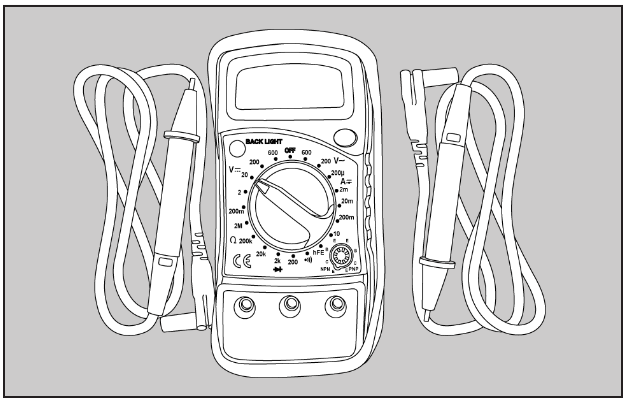
c. Method of Checking (Toggle switch will be given here by the RE DNA team for the user to select either one of them)

1.2 - Using Breakout Box method

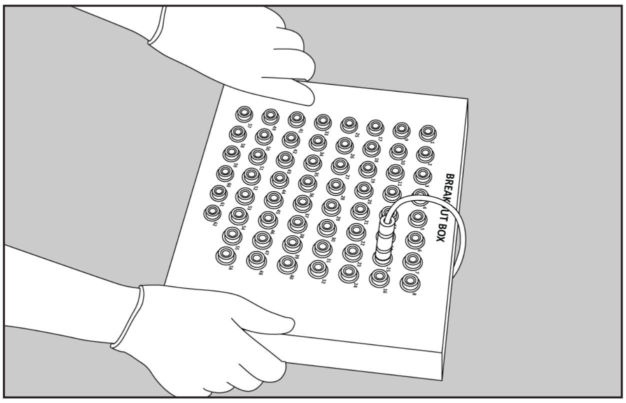
1.3 - Using Test lead wire method

1.2. USING BREAKOUT BOX METHOD

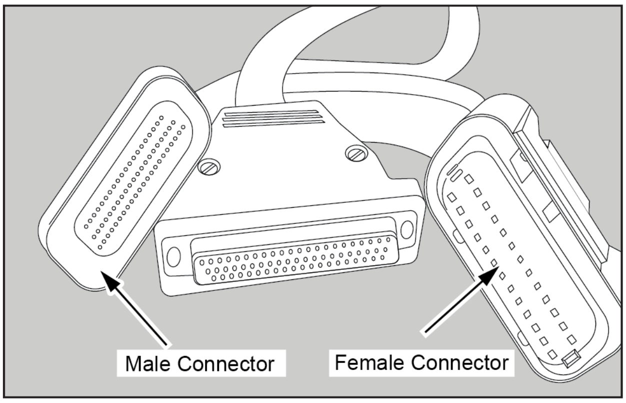
- **Tools Required**
- Multimeter (Universal)



- 62 P ECU Breakout Box (ST 30275/A) - 62 Pin Kit

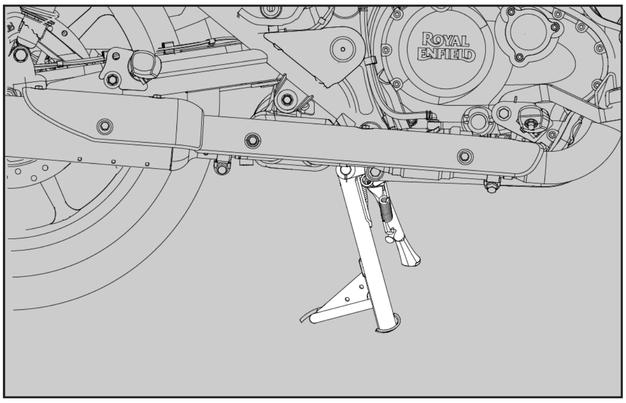

BREAKOUT BOX

- 26 Pin ECU Breakout Box Harness (ST30923/A)

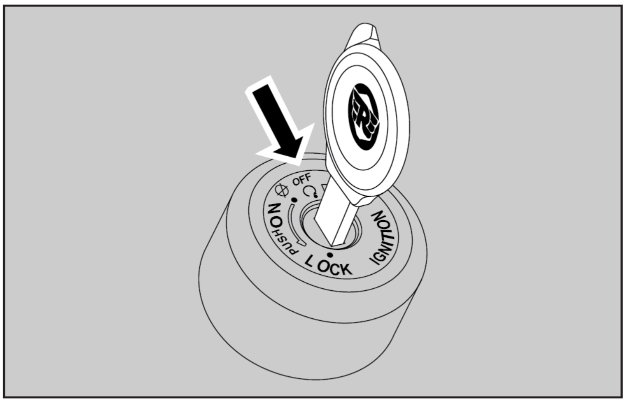

Male Connector
Female Connector

b. Pre-Checks:

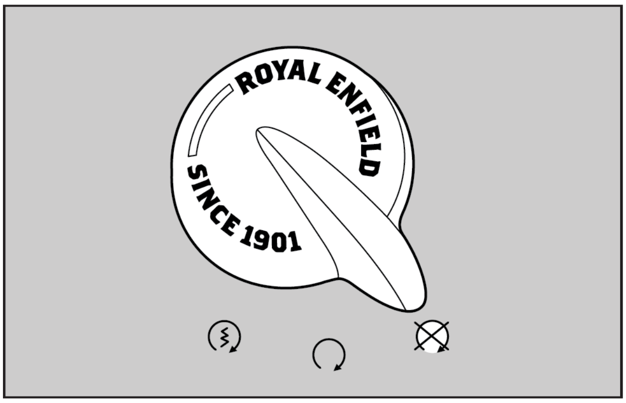
- Ensure the vehicle is on Centre stand position


ROYAL ENFIELD

- Ensure the Ignition is in “OFF” condition


OFF
LOCK
IGNITION
PUSH ON

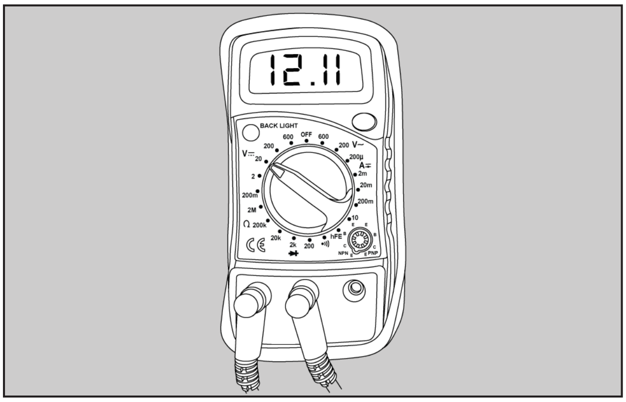
- Ensure the Kill Switch is in “OFF” condition


ROYAL ENFIELD
SINCE 1901

- Check Battery Voltage using Multimeter and it should be more than 12V

(If the battery voltage is less - Please Charge the battery sufficiently to make it to required voltage of 12 V and still voltage found to be less, you may replace with new battery)

- Please ensure a healthy battery which is more than 12V to perform the further below listed activity


12.11
BACK LIGHT

⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the diagnosis steps

c. Diagnostics

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch "OFF" the Engine Kill switch & Ignition switch in "OFF" condition while checking the connections/couplers

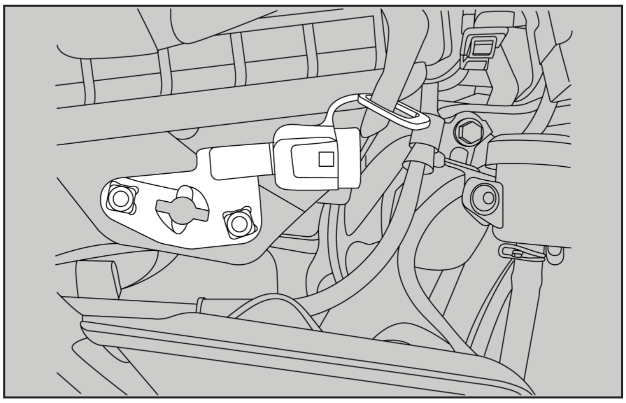
NOTE

- *Please remove right-side panel to locate the diagnostic coupler*

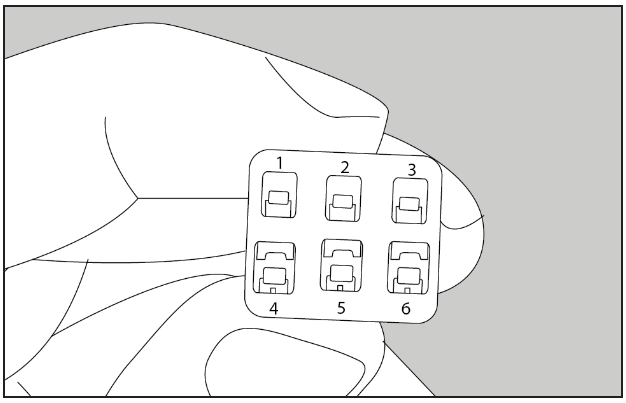
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Diagnosis coupler is located in the Right side panel



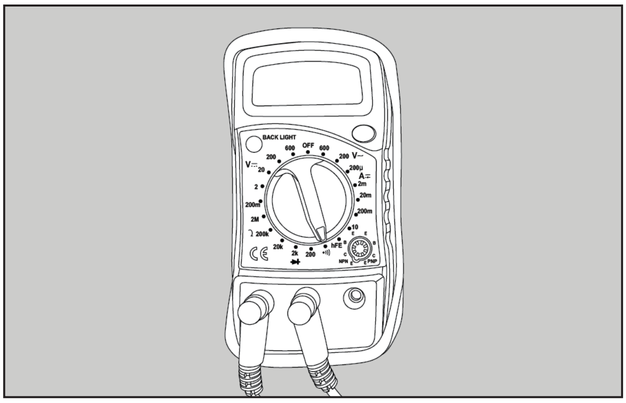
- Remove the rubber cap of the Diagnosis coupler



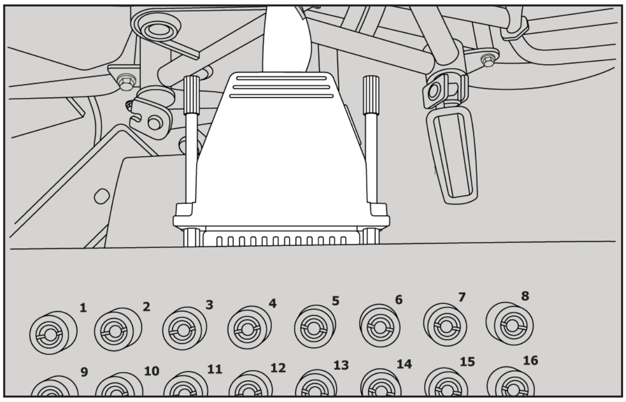
To check Continuity of the Wiring Harness

STEP 1:

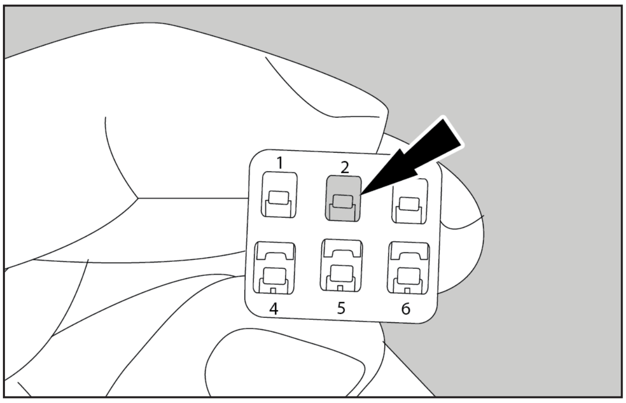
- Keep the multimeter in continuity mode

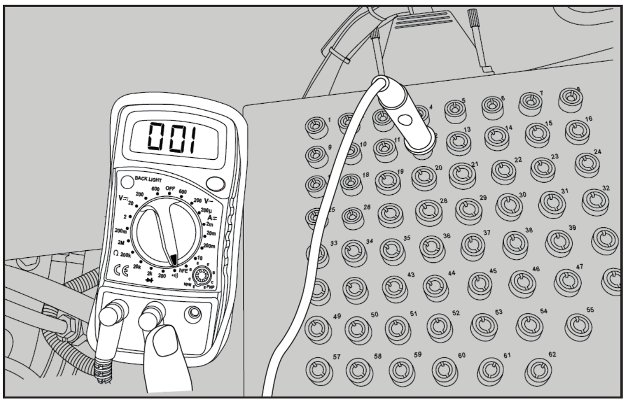

BACK LIGHT
OFF
600
600
200
V~
200
V
20
2
200m
2M
200k
20k
2k
200
hFE
A
2m
20m
200m
10
NPN
PNP

- Connect the ECU breakout box harness to ECU wiring harness coupler

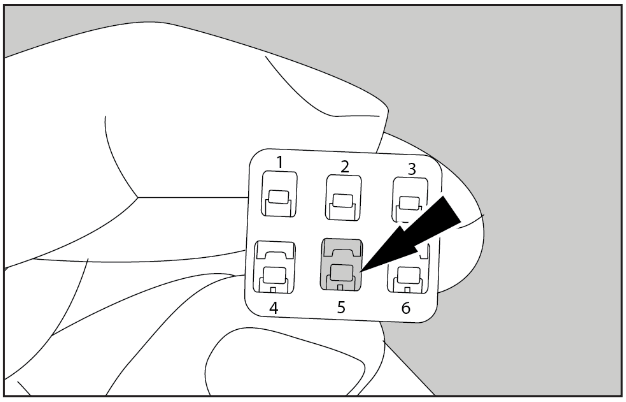

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

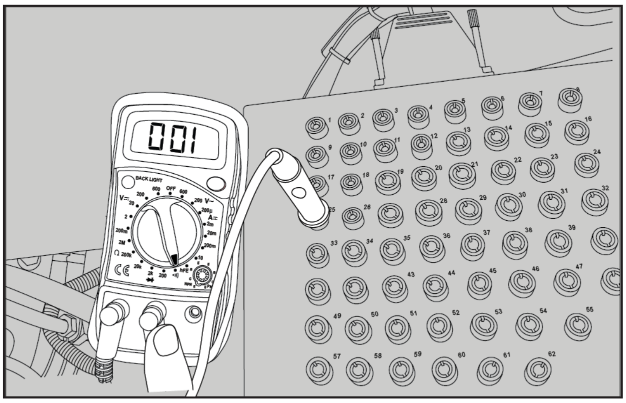
- Keep the multimeter positive probe in Pin 2 of the CAN socket and negative probe in socket 12 of the ECU breakout box check for continuity (beep sound from multimeter





- Keep the multimeter positive probe on Pin 5 of the CAN socket and negative probe on socket 25 of the ECU breakout box. To check continuity (Beep sound from the multimeter)





d. Decision Point:

- If continuity is not available you may please replace the Wiring harness.

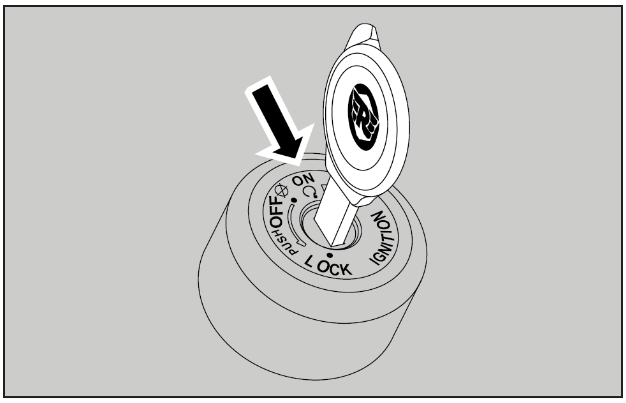
It is recommended to replace the CAN Circuit/ECU / Wiring Harness as per the advice from Royal Enfield only

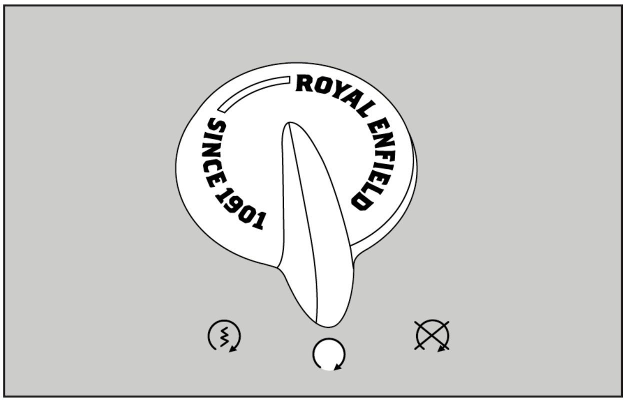
DTC Clearing Procedure:

⚠ CAUTION

With sensor connector disconnected and ignition is switched "ON", DTC will occur from history and need to follow the below steps to clear the same

- Ensure Ignition & Kill Switch is in "ON" Position





- If the fault is rectified, Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Switch "OFF" the ignition key and again switch "ON" - repeat this cycle for 3 times till the MIL is "OFF"
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle.

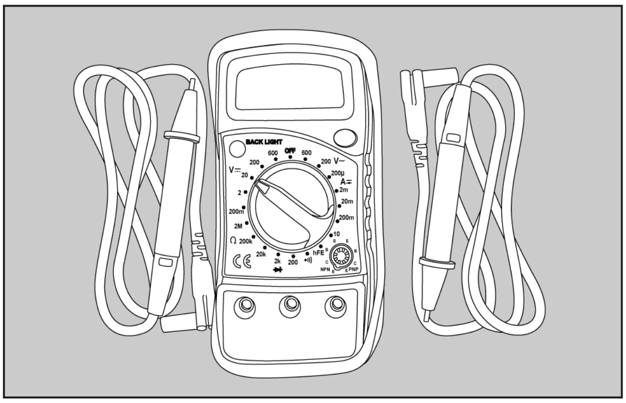
1.3. TEST LEAD WIRE METHOD :

⚠ WARNING

- **Do not disconnect and connect any sensor or ECU with ignition "ON" condition**
- **Please ensure the inserting of the correct pin to pin mapping between Harness connector and Sensor. Wrong pin mapping can result in damaging the complete system including Sensor and ECU.**
- **Test lead wire is used/inserted as per the recommendation while doing diagnosis/ measurements. If the wrong test lead wire are inserted, it may permanently damage the Vehicle Harness Connector or Sensor terminals and to capture the correct measuring parameter and data interpretation.**
- **Should not be used between Wiring harness and any ECU or Cluster to avoid short circuit which might permanently damage the electronic devices without any symptoms**
- **To use only while diagnosis to avoid short between pins or any extended leads which are not connected**
- **Necessary pre-check to be followed to avoid contact of free wires or terminals to any metal surface like chassis, engine, etc which might result in short circuit**
- **Please ensure Ignition is turned "OFF" while connecting and removal of test kit to avoid any creation any voltage fluctuation**
- **Do not disconnect and connect any sensor or ECU with ignition On**
- **With sensor connector disconnected and ignition is switched on, DTC will occur and need to follow the DTC clearing procedure after reconnecting**
- **Shall not be used for any other purpose other than diagnosis like interlink for vehicle starting and riding back to the service center, jump-starting, etc.**

Tools Required

- Multimeter (Universal)


BACK LIGHT
600
OFF
600
200
200 V~
V⎓
20
200µ
A⎓
2
2m
20m
200m
200m
2M
10
Ω 200k
20k
2k
200
hFE
B
E
E
B
C
C
NPN
E
E
PNP
CE

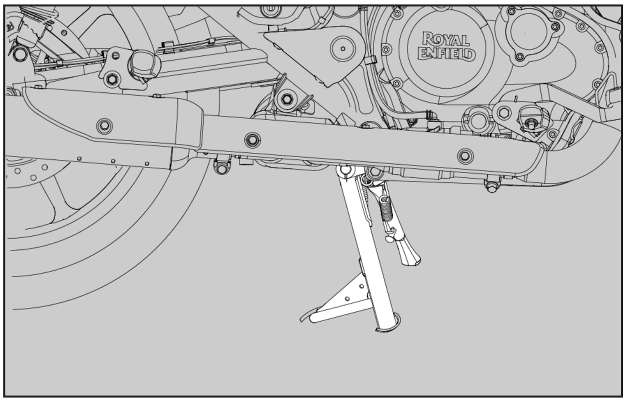
- Test lead wire(90 SERIES - Orange Color wire)
- Test lead wire (40 SERIES - Yellow Color Wire) for ECU coupler

Refer Chart for Color identification of Pins (hyperlink to be placed here)

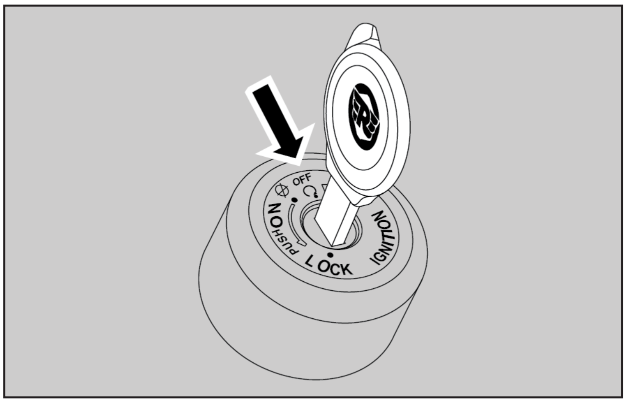
Sl. No	Qty	Male Terminal Tab width (in mm)	Series	Possible Sensor detection	W1/W2 Wire Color		HST 1 / HST 2/ HST 3 Color					
					Type	Color	Test lead wire 1	Test lead wire 2	Test lead wire 3	Test lead wire 4	Test lead wire 5	Test lead wire 6
1	6	0.64	25	1 .Instrument Cluster 2. Wheel Speed Sensor	0.5 SQ	Grey	Black	Red	Yellow	Green	White	Blue
2	6	1.0	40	1. EMS ECU 2. ABS ECU	1.0 SQ	Yellow	Black	Red	Yellow	Green	White	Blue
3	6	1.5	60	1. Oxygen/Lambda Sensor	1.0 SQ	Blue	Black	Red	Yellow	Green	White	Blue
4	6	2.2	90	1. Ignition Coil 2. Engine oil temperature sensor 3.Injector 4.Fuel Pump 5. Gear position sensor 6.Pulsar Coil 6.Dongle Connector	1.0 SQ	Orange	Black	Red	Yellow	Green	White	Blue
5	6	2.8	110	1. SAI Solenoid 2. EVAP	1.0 SQ	Black	Black	Red	Yellow	Green	White	Blue

Choose the correct Series test kit as per the above chart before proceeding for diagnosis step

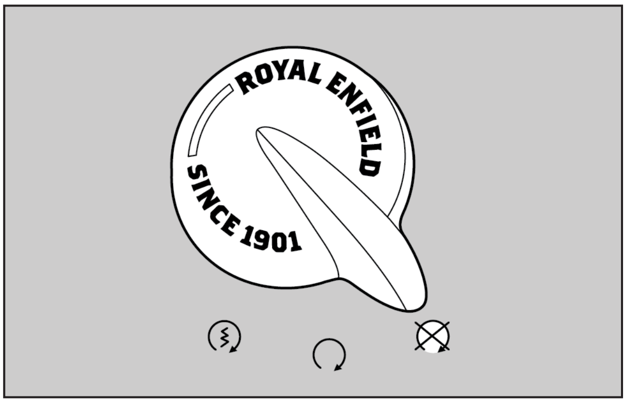
- **Pre-Checks**
- Ensure the vehicle is on Centre stand position



- Ensure the Ignition is in “OFF” condition

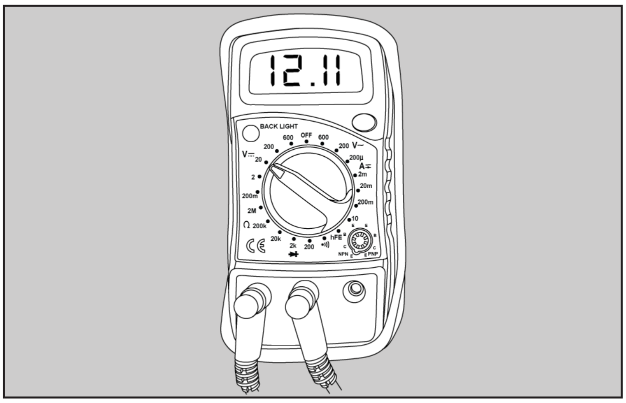


- Ensure the Kill Switch is in “OFF” condition



- Check Battery Voltage using Multimeter and it should be more than 12 V

(If the battery voltage is less - Please Charge the battery sufficiently to reach 12 V and use the same and still voltage found to be less, you may replace with new battery)



⚠ CAUTION

Failure to adhere to the above pre-check points may cause damage to the EMS system. After Ensuring above precondition only you are advised to proceed for the diagnosis steps

c. Diagnostics:

⚠ WARNING

The engine and exhaust systems get extremely hot during normal operation and can result in serious burns if touched. Make sure exhaust pipes are not hot and are at the same level of ambient/ surrounding temperature, whenever working on engine or exhaust systems.

⚠ CAUTION

Always switch “OFF” the Engine Kill switch & Ignition switch in “OFF” condition while checking the connections/couplers

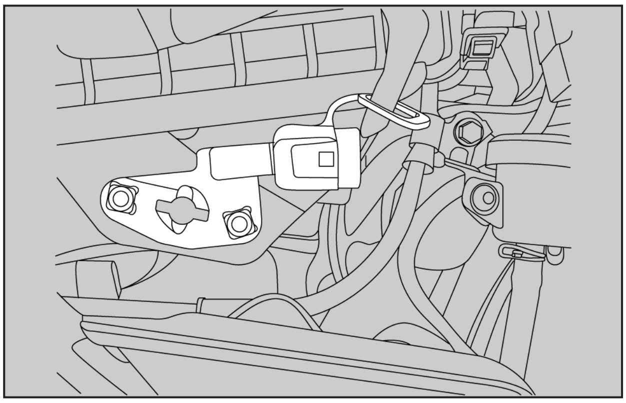
NOTE

- *Please remove right-side panel to locate the diagnostic coupler*

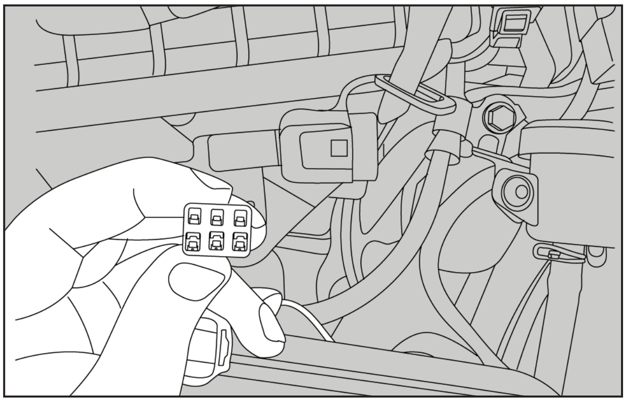
NOTE

- *Removal & refitment right-side panel mentioned in the service manual (exclusive hyperlink here)*

- Diagnosis coupler is located in the Right side panel



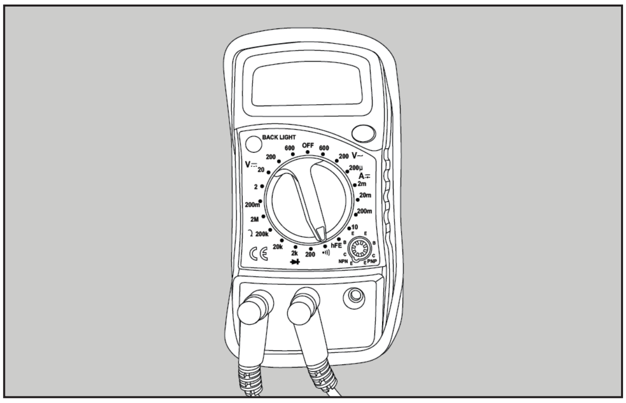
- Remove the rubber cap of the Diagnosis coupler



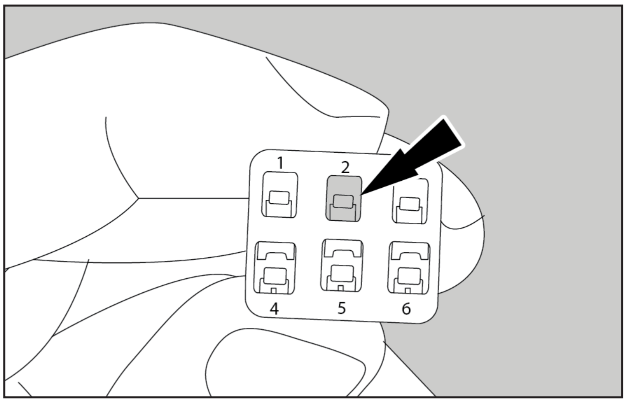
To check Continuity of the Wiring Harness

STEP 1:

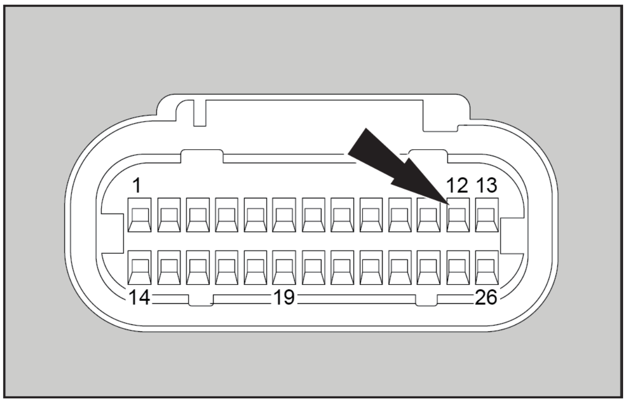
- Keep the multimeter in continuity mode



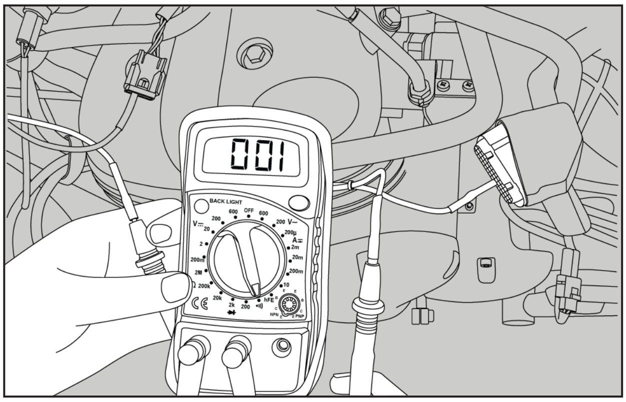
- Connect 90 series (Orange color) test lead wire with the black tag to pin 2 of the Diagnosis coupler.



- Connect 40 series (yellow color) test lead wire with the black tag to pin 12 of the ECU wiring harness coupler

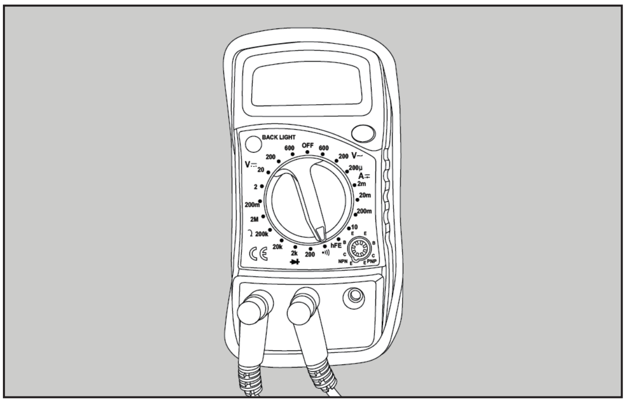


- Check for continuity (Beep sound from a multimeter)

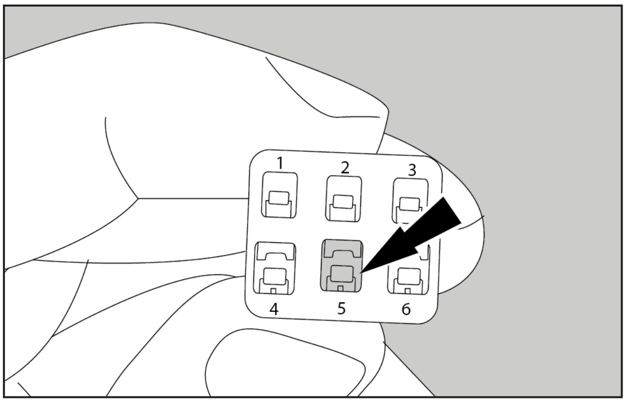


STEP 2:

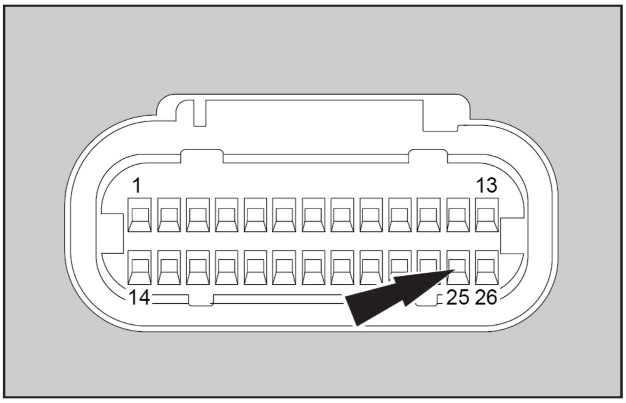
- Keep the multimeter in continuity mode



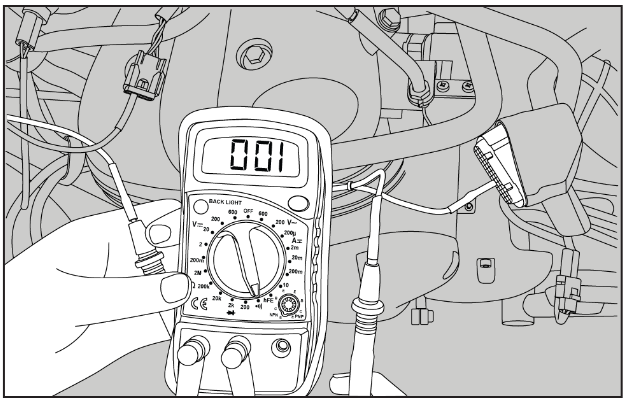
- Connect 90 series (Orange color) test lead wire with the white tag to pin 5 of the Diagnosis coupler.



- Connect 40 series (yellow color) test lead wire with the red tag to pin 25 of the ECU wiring harness coupler

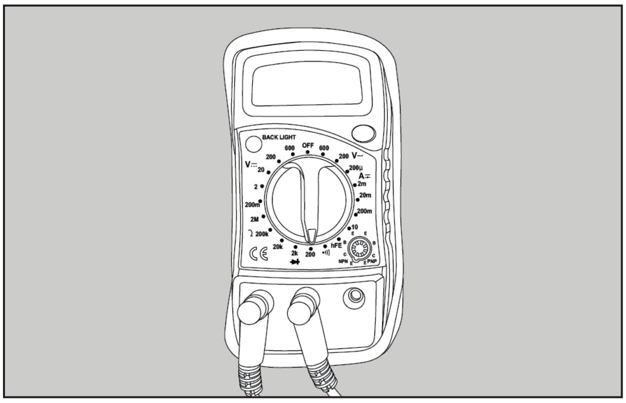


- Check for continuity (Beep sound from a multimeter)

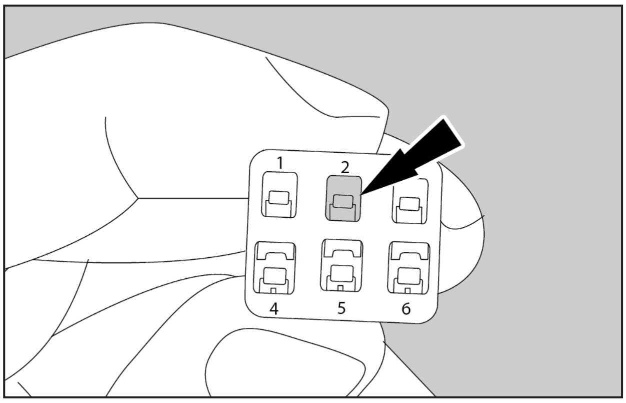


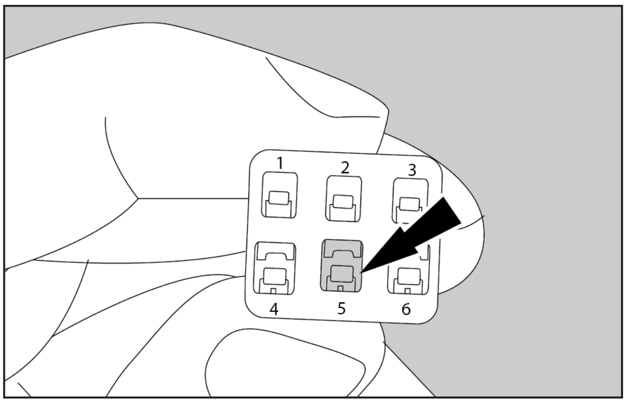
b. To check Resistance of the CAN Bus

- Keep the multimeter in resistance mode

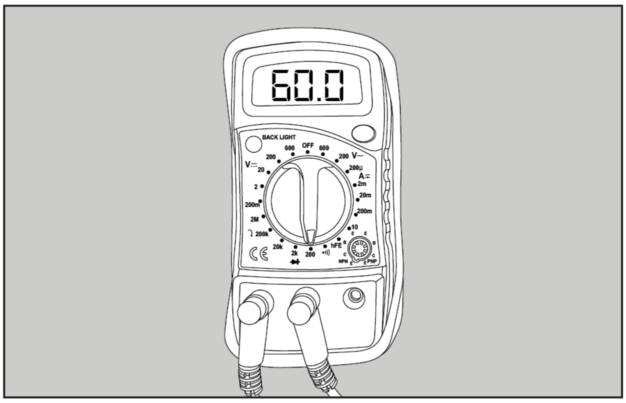


- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the Diagnosis coupler and connect test lead wire 90 series (Orange color) with the white tag to pin 5 of the Diagnosis coupler



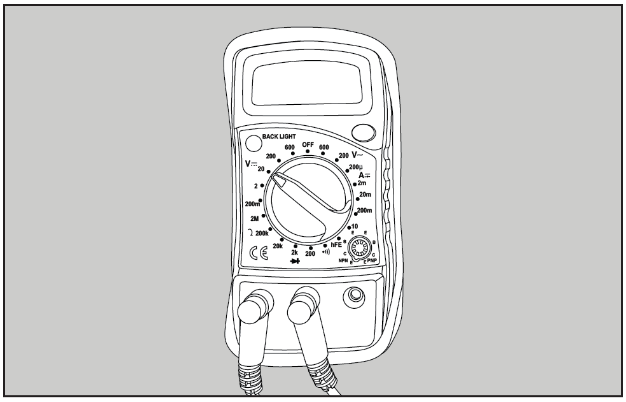


- Check the Resistance between Pin 2 and Pin 5. Resistance value to be 60 Ohms.

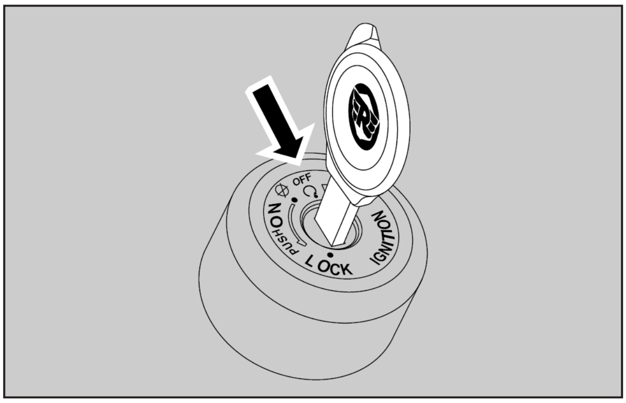

60.0
BACK LIGHT
OFF

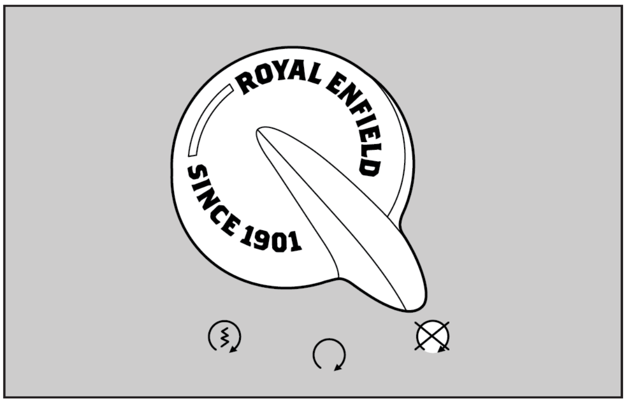
To check voltage:

- Keep the multimeter in Voltage mode (20 V)

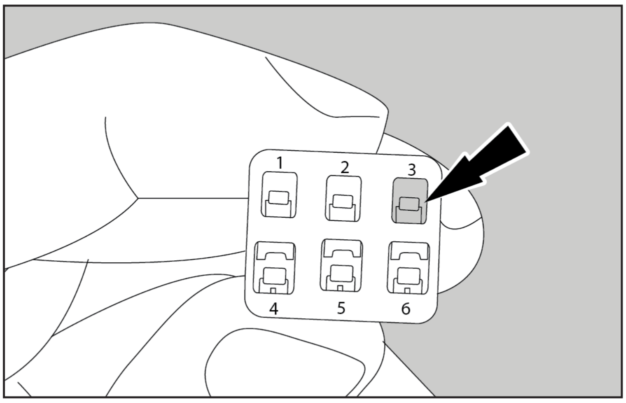

BACK LIGHT
OFF

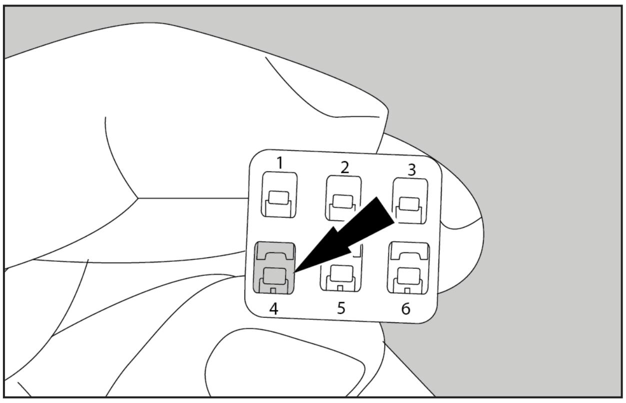
- Ensure Ignition & Kill Switch is in “ON” Position


OFF
PUSH ON
LOCK
IGNITION

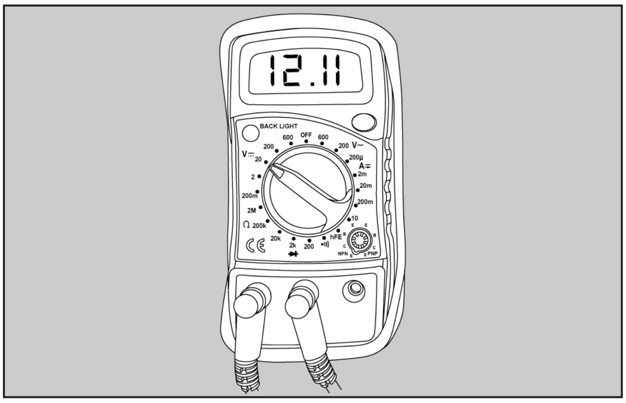

ROYAL ENFIELD
SINCE 1901

- Connect test lead wire 90 series (orange color) with the yellow tag to Pin 3 of the Diagnosis coupler and connect test lead wire 90 series (orange color) with the green tag to pin 4 of the Diagnosis coupler



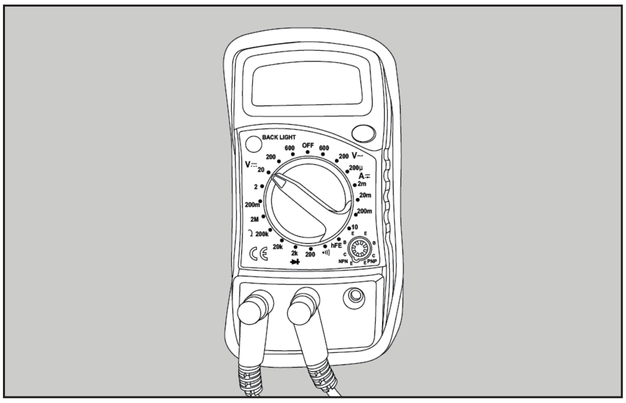


- Check the battery voltage, it should be 12 V

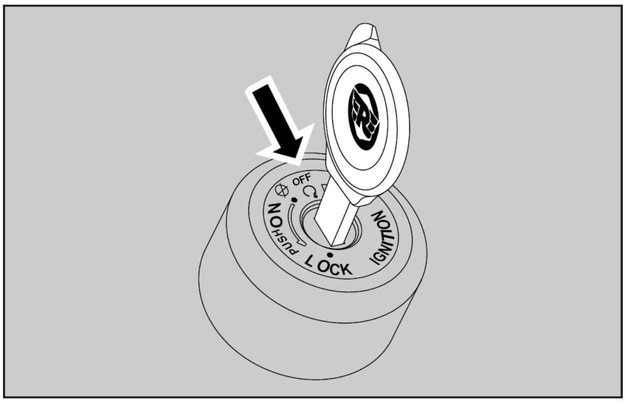


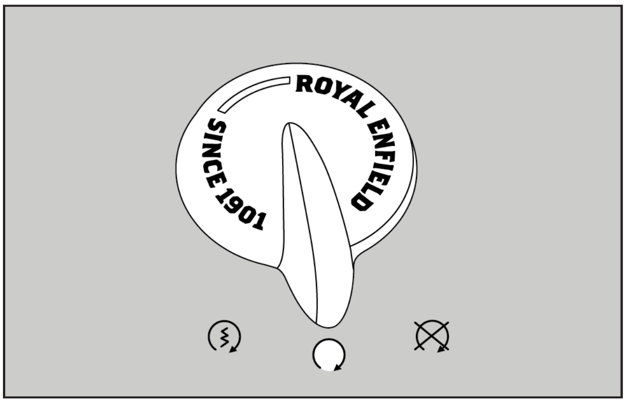
To check System voltage

- Keep the multimeter in voltage mode (20V)



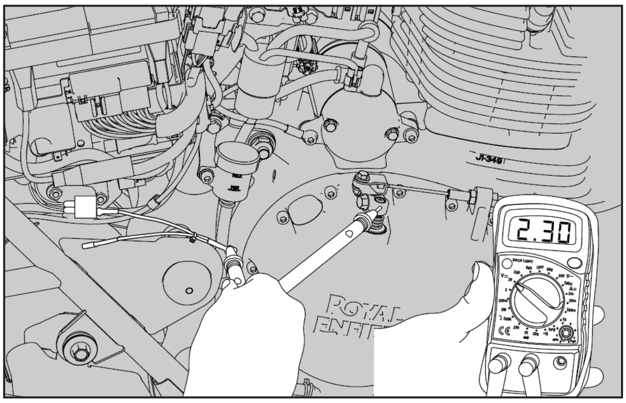
- Ensure Ignition & Kill Switch is in "ON" Position


OFF
PUSH ON
LOCK
IGNITION


ROYAL ENFIELD
SINCE 1901

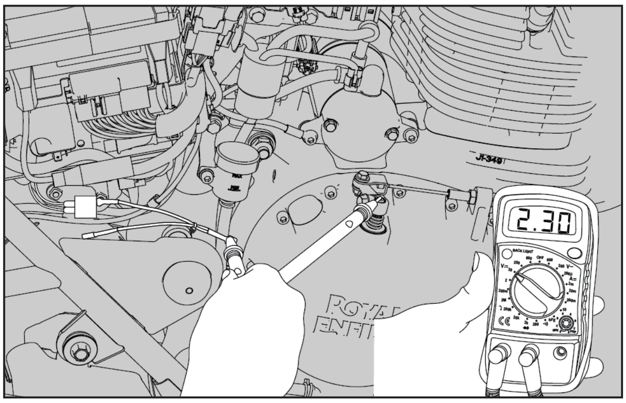
CAN High

- Connect test lead wire 90 series (orange color) with the red tag to Pin 2 of the Diagnosis coupler and keep the multimeter positive probe in Pin 2 and negative probe in body ground, The Voltage should be 2 V to 4.5 V



CAN Low

- Connect test lead wire 90 series (orange color) with the white tag to Pin 5 of the Diagnosis coupler and keep the multimeter positive probe in Pin 5 and negative probe in body ground, The Voltage should be 0.5 V to 3 V



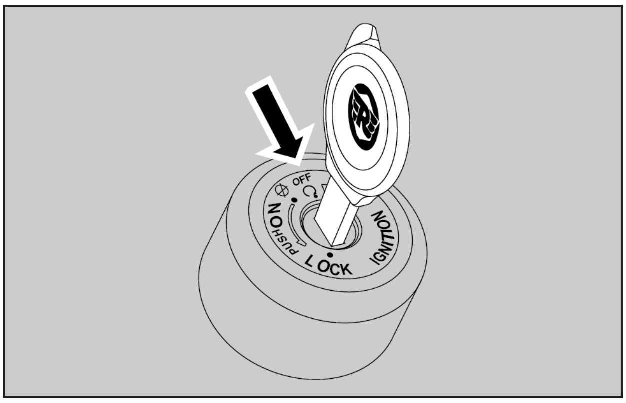
d. Decision Point:

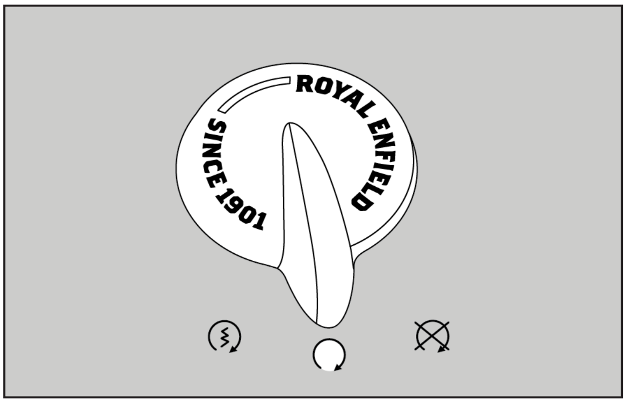
- If continuity is not available you may please replace the Wiring harness.
- If the resistance is not within the specified limit (60 ohms) you may replace the CAN Circuit
- If the voltage is meeting the specified limit, if resistance is between the specified limit and if continuity is available you have to replace the ECU.

It is recommended to replace the CAN Circuit/ECU / Wiring Harness as per the advice from Royal Enfield only

DTC Clearing Procedure:

- Ensure Ignition & Kill Switch is in "ON" Position





- Click on Erase DTC Icon
- Click yes to confirm to erase DTC's
- Now it will appear as "NO DTC's", hence all the error logs cleared.
- Start the Engine to know the MIL condition
- Now check if the malfunction indicator lamp is glowing and ensure the normal running condition of the motorcycle

INDEX

A

ABS toner wheel
Adjuster nut
Air cut valve (ACV)
Air Filter Box Assembly
Air Filter Element

B

Balancer Shaft
Battery
Bearing
Brake lamp switch
Brake pedal
Breather Hose

C

Camshaft
Center Stand
Chain adjusters
Chain drive sprocket
Clevis pin
Clutch
Clutch Cable
Clutch Cable
Clutch Cover
Connecting Rod
Control Cables
Countershaft
Cradle Assembly LH
Cradle Assembly RH
Crankshaft
Cylinder Barrel
Cylinder Head
Cylinder Head Cover

D

Drain Hose
Drain Plug
Drive chain
Drive chain
Driveshaft

E

E-clip
Engine
Engine Oil
Engine Troubleshooting
EVAP
Exhaust Pipes and Silencers

F

FD Sprocket
Footrests
Fork Assembly
Frame Adjuster
Front Brake Disc
Front Mudguard
Front Number Plate
Front Wheel
Fuel Filter
Fuel Float
Fuel Tank

G

Gear Position Indicator Sensor
Gear Shift Linkage
Grab Handle

H

Handlebar
Handlebar brace
Handlebar riser
Headlamp
Heel guard

I

IAT sensor
Idle Speed Controller (ISC)
Ignition switch
Injector
Inlet Manifold Rubber Flange

J

Journal Bearing

L

Lever Eyelet
LH Cylinder Rocker Carrier
Limiter pad
Lower Crankcase

Lubrication

M

Magneto Cover
Magneto Rotor
Manifold Absolute Pressure (MAP) Sensor
Master cylinder assembly
Mudflap

O

Oil Cooler Inlet and Outlet Pipes
Oil Filter
Oil Jet
Oil Pan
Oil Pressure Switch
Oil Pump

P

Piston
Piston Ring

R

Rear Brake Disc
Rear Mudguard
Rear Mudguard Infill Cover
Rear Number Plate
Rear view mirror
Rear Wheel
Reed Valves
RH Cylinder Rocker Carrier
Rider Seat

S

Saree Guard
Seat Assembly
Sensors
Shifter Drum
Shifter fork
Shifter Shaft
Shock absorber
Side Panels
Side Stand
Spark Plug
Spark Plug Suppressor Caps
Starter Motor
Steering Stem
Swing Arm
Switch module

T

Tappet Adjusters
Throttle Body
Throttle Cable
Throttle Position Sensor (TPS)
Throttle rotor housing
Timing Chain Tensioner
Toner wheel
Top Yoke - Continental GT

U

Upper Crankcase

V

Valve

W

Wheel hub
Wheel speed sensor assembly
Wheels

GLOSSARY

13.2 Glossary

Aggregates	Description
ACV	Air Cut Valve
ABS	Anti-lock braking system
B+	Battery positive
BDC	Bottom dead center
BRG	Bearing
°C	Celsius (Centigrade)
CAL	Calibration
CC	Cubic centimeters
Cm	Centimeters
CKP	Crankshaft position
DTC	Diagnostic trouble code
DOT	Department of Transportation
DMS	Dealer management system
ECM	Engine control module
ET	Engine temperature
ECU	Electronic Control Unit
EMS	Engine Management System
EFI	Electronic fuel injection
EVAP	Evaporative emissions
FI	Fuel injection
ft-lbs	Foot pounds
FD	Final Drive
gal	gallon

Aggregates	Description
GPS	Gear Position Sensor
HO2S	Heated oxygen sensor
hp	Horsepower
Hego	Heated Exhaust Gas Oxygen
HT cable	High tension cable
hr	Hour
IAC	Idle air control
IAT	Intake air temperature
IC	Instrument cluster
ID	Inside diameter
IGN	Ignition
in-lbs	Inch pounds
kg	Kilogram
km	Kilometer
km/h	Kilometers per hour
kW	Kilowatt
L	Litre
lbs	Pounds
LCD	Liquid crystal display
LH	Lefthand
MAP	Manifold absolute pressure
max	Maximum
mi	Miles

Aggregates	Description
min	Minimum
mm	Millimeter
mph	Miles per hour
Nm	Newton-meter
N/A	Not applicable
NRB	Needle Roller Bearing
O2	Oxygen
OD	Outside diameter
OEM	Original equipment manufacturer
P&A	Parts and Accessories
PAV	Pulse Air Valve
psi	Pounds per square inch
PWM signal	Pulse width modulated
qt	Quart
R	Resistence
RR	Regulator and Rectifier
RLY	Relay (Electrical)
RES	Reserve mark on fuel supply
RH	Righthand
RPM	Revolutions per minute
S	seconds
SPL	Special Tool

Aggregates	Description
SOHC	Single Over Head Cam
TB	Throttle Body
TDC	Top dead center
TWI	Tyre wear indicator
TPS	Throttle position sensor
TS	Turn signal
VAC	Volts of alternating current
VDC	Volts of direct current
VIN	Vehicle identification number
VSS	Vehicle speed sensor
W	Watt
WSS	Wheel speed sensor

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